

Advanced Weather Spotting for the Inland Northwest

Spring 2021

National Weather Service - Spokane



Clyde, WA - Dave Brock
May 2020



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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

This is a Live Virtual Class

- Voice in Computer - no phone needed - headphones helpful
- All are in listen mode until the end

New to GoToWebinar? Here's the basics



the Menu bar

- Audio – tests your volume
- Attendees – all in attendance
- Poll – answer poll questions
- **Questions** – type in a question for the speaker to answer
- **Handouts** – download & print
- Chat – speaker's comments
- Click on the **Hand** to raise
- Click orange arrow to collapse window



Objectives

- Understand the roles & importance of the Weather Spotter
- Describe your community's severe weather threats
- Provide accurate and timely reports of severe weather
- Properly define a severe thunderstorm and basic thunderstorm structure
- Identify cloud types and features of thunderstorms.
- Learn how to prepare and be safe during severe weather

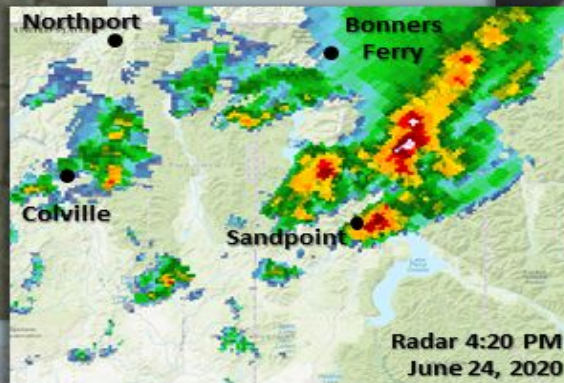
Concentration on Thunderstorms and Severe Weather Risk Awareness
Now let's look back to last year...



June 24, 2020 - Severe Thunderstorm Event



Naples, ID



Port Hill, ID



Near Ruby, WA

May 30, 2020 - Severe Thunderstorm Event



May 2, 2020 - Thunderstorm & Dust Event



Post Falls, ID



North of Tri Cities



Pullman



Colfax

To our current Weather Spotters....



**THANK
YOU!**



Eyes and Ears of the
National Weather Service
with a count of over 1200
across the Inland NW!



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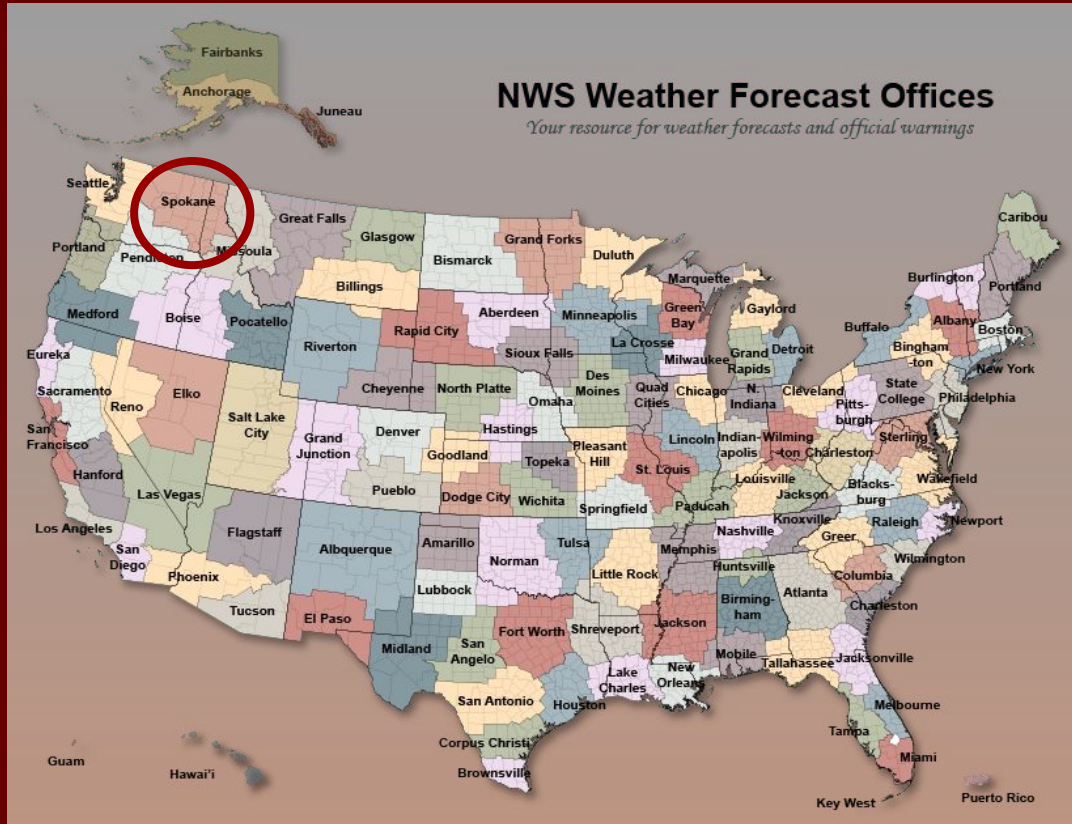
National Weather Service (NWS)

- Part of the Federal Government – Dept of Commerce
- Responsible for all weather/water Watches & Warnings
- 126 offices across the country
- Work with local agencies
- Observe & Forecast
- “Behind the Scenes”
- Decision Support
- Preparedness & Education

**Issue Weather and Water watches/warnings
for the protection of life and property.**



NWS Spokane Forecast and Warning Area

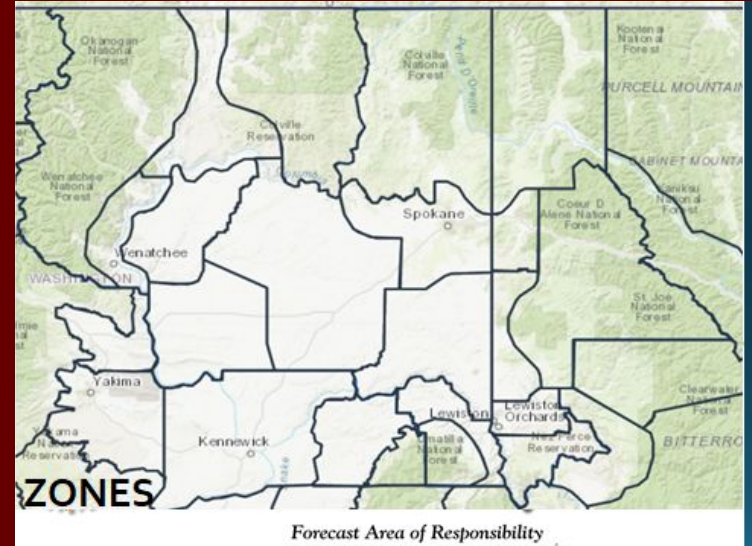


Includes 2 states

- 13 counties in eastern WA
- 8 counties in north Idaho

Elevations range

- 9500+ ft in the north Cascades
- 170 ft along the mid Columbia River



Issue watches/warnings for the protection of life and property



NWS Observations & Tools



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- 



Radiosondes

- Twice a day; every day
- 92 Upper Air sites across the U.S.
- About 100,000 ft (~19 miles) high
- One hour and 45 minutes flight
- After the balloon pops, a parachute opens and it falls back to the earth
- Less than 20% are recovered and mailed back
- Radiosonde chart gives a profile of temperature, dewpoint, winds through a column of the atmosphere.

Where to find this chart online?

<http://weather.rap.ucar.edu/upper/otx.gif>

NWS Spokane web page:

Forecasts tab – Forecast models

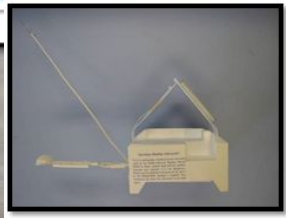
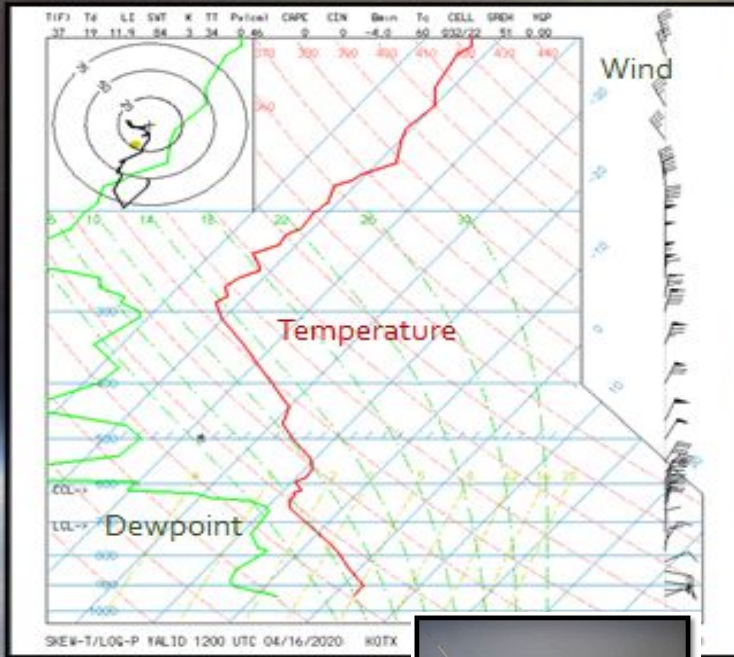


Photo courtesy of Earth to Sky Calculus



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Weather Satellites

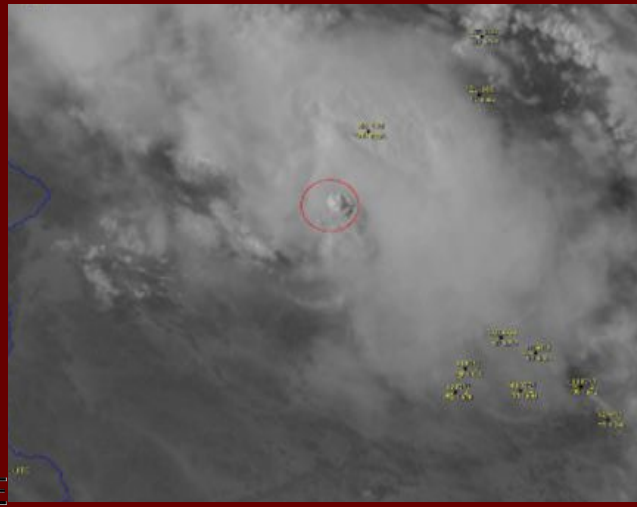
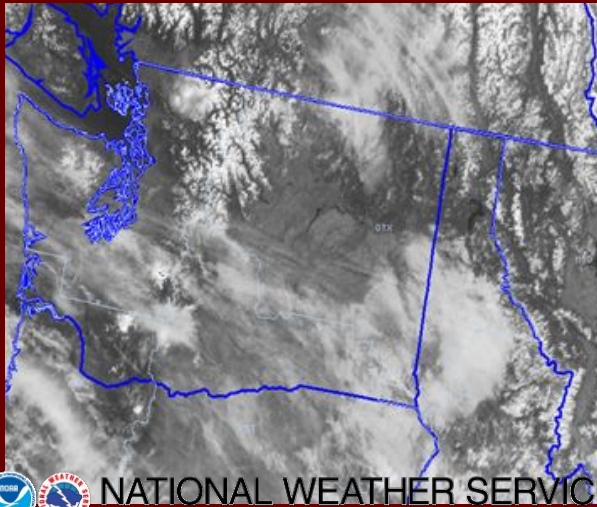
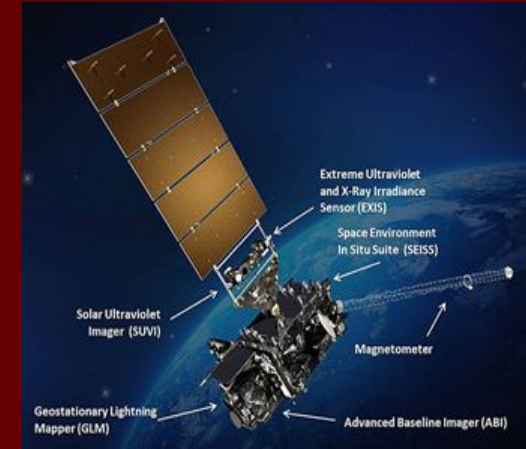
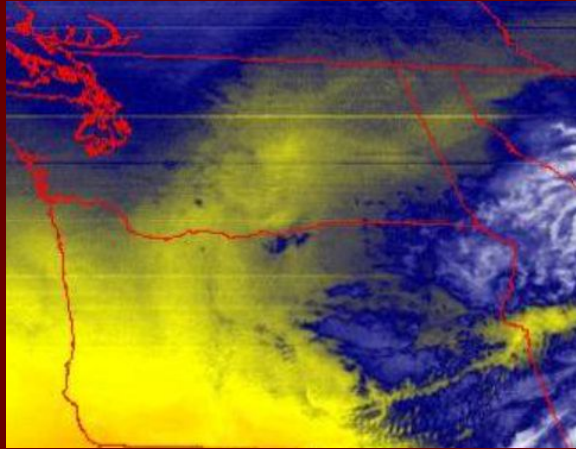
GOES 17 - 16 different channels

IR, Water Vapor & Visible

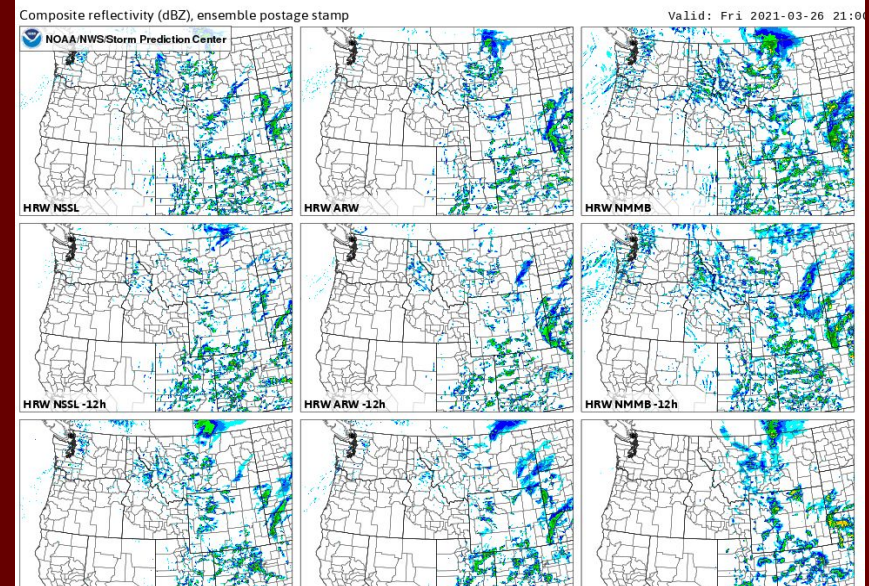
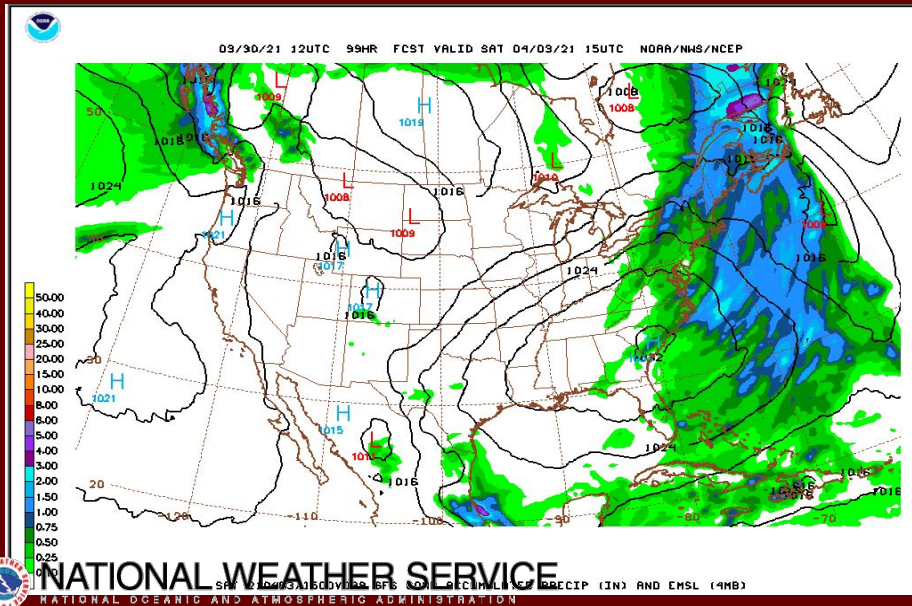
New images every 5 minutes

Aids in early detection

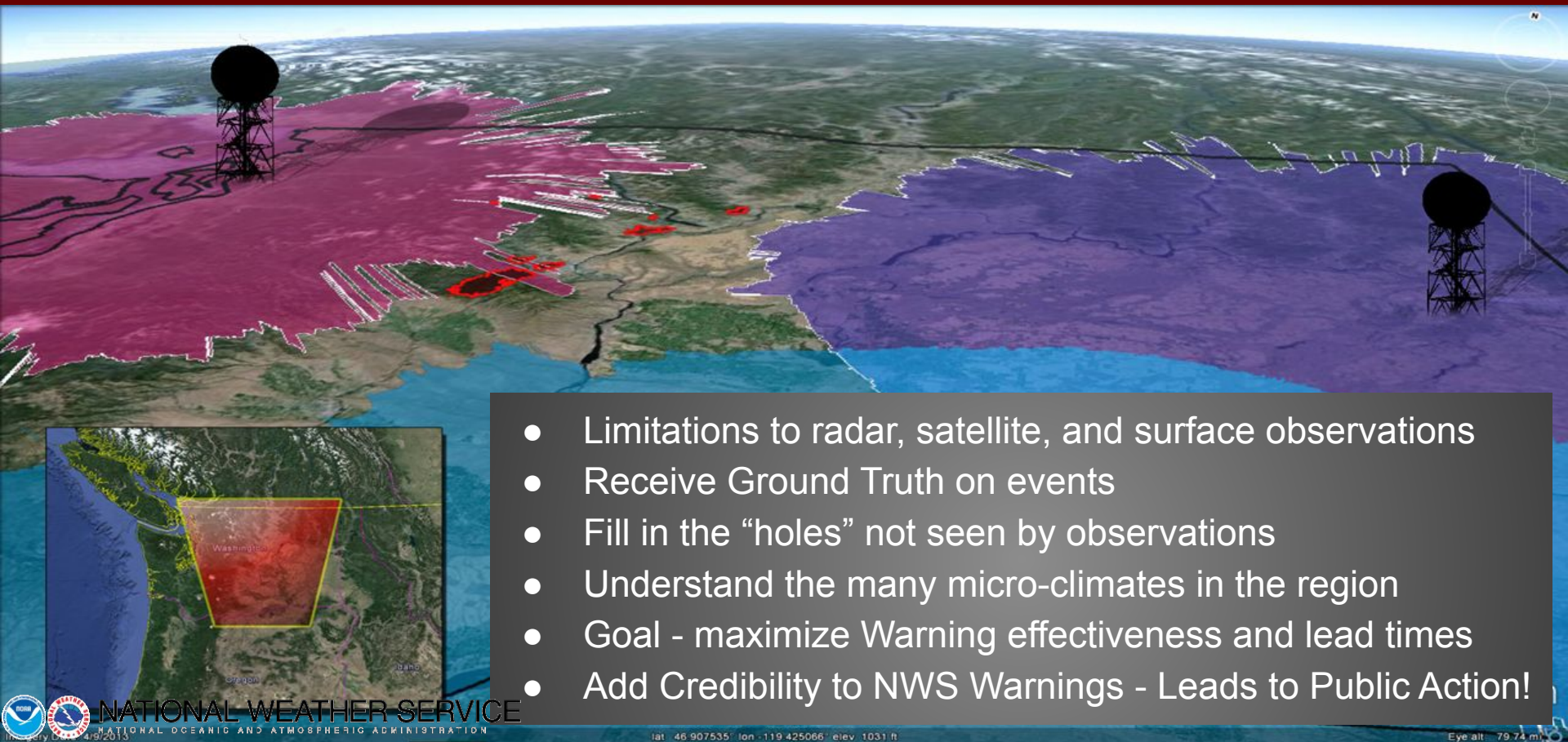
Thunderstorms & Wildfires



Supercomputers & Resolution Models



We need weather spotters! Why?



- Limitations to radar, satellite, and surface observations
- Receive Ground Truth on events
- Fill in the “holes” not seen by observations
- Understand the many micro-climates in the region
- Goal - maximize Warning effectiveness and lead times
- Add Credibility to NWS Warnings - Leads to Public Action!

#1 Poll Question

Why are weather spotters important?



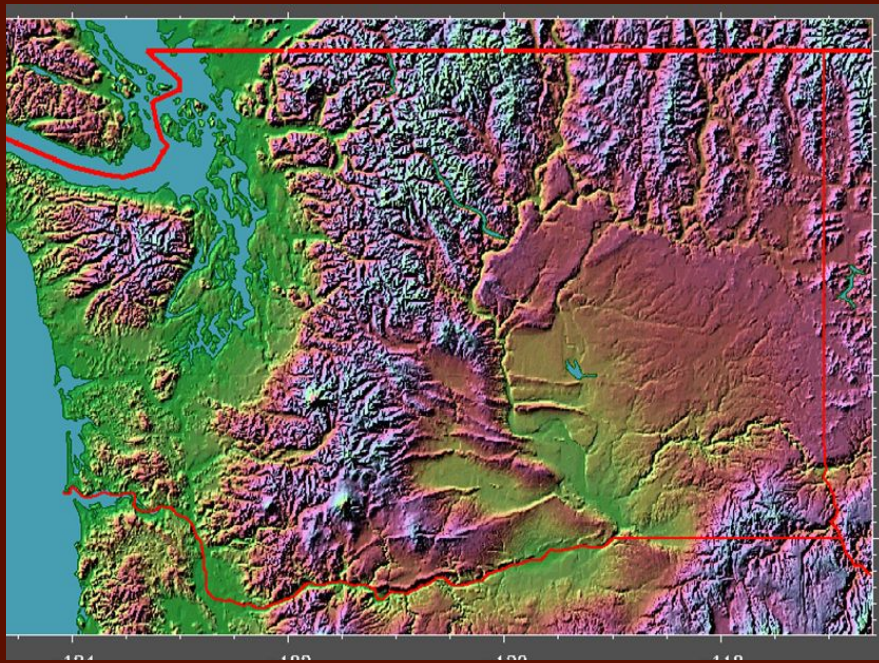
Weather Hazards Change with the Seasons

Main weather concerns change with the season & include:

- Winter storms – snow, ice, rain and wind
- Flooding – river flooding and flash flooding
- Fire weather – wind and dryness, lightning and smoke
- Thunderstorms – hail, wind, rain and lightning

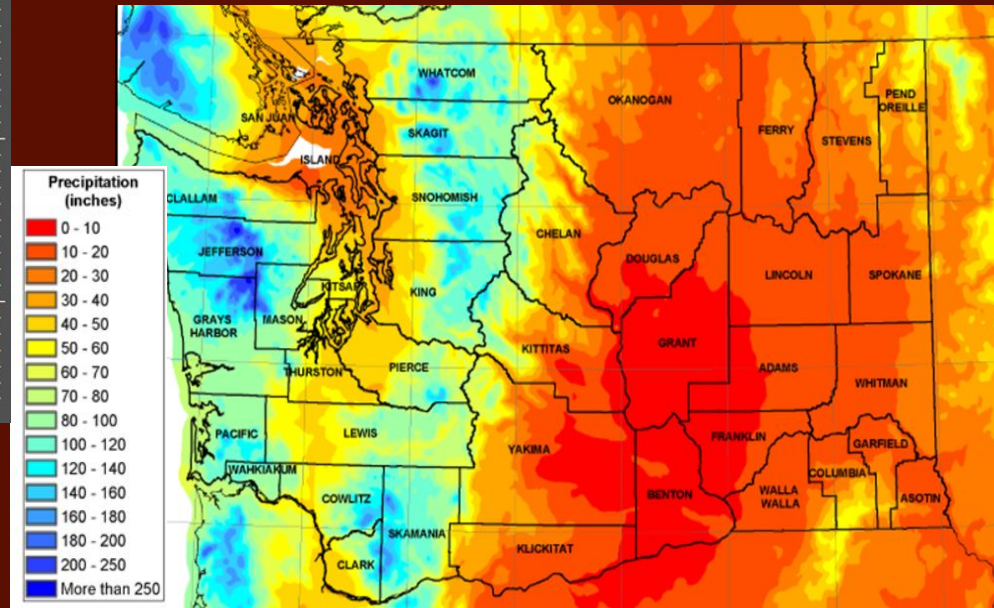


Terrain Makes ALL the Difference



Topography Map

Average Annual Precipitation Map



What's in a Spotter Report?

	Inland Northwest Weather Spotter Checklist	
Tornado or Funnel Cloud: ANY Kind		
Strong Winds: +40 mph/Damage (58mph severe)		
Hail: +3/4" in diameter (1" severe)		
Heavy Rain: +1/2" in 1 hr or +1" in 12 hrs		
Flooding: ANY Kind		
Mixed Precipitation: freezing rain or sleet		
Snow: +2" below 3K ft (valleys) or +6" abv 3K ft (mlns)		
Poor Visibility: 1/2 mile or less		
Travel Problems: due to weather		
Damage, Injury or Loss of life: ANY		
Excessive Heat: ANY		
Excessive Cold: ANY		

- Specifics...Tell us the story!

- Who...What...and Where

Spotter ID & Location

- When the event began and/or ended

- Estimate of wind speed and/or hail size

- Damage and injury reports

- If unsure - report your uncertainty

- Include reports while traveling & any delayed or second hand reports

#2 Poll Question

What types of severe or hazardous weather do we NOT experience in the Inland NW?



How Spotters Report - Easiest Phone Call



Dial :
1-800-
483-4532
Spotter ID



What:
Event you
Witnessed



Where:
Location
of event



When:
Time of
the event

How Spotters Report – Just as easy Online Reports

www.weather.gov/Spokane



Storm Reports

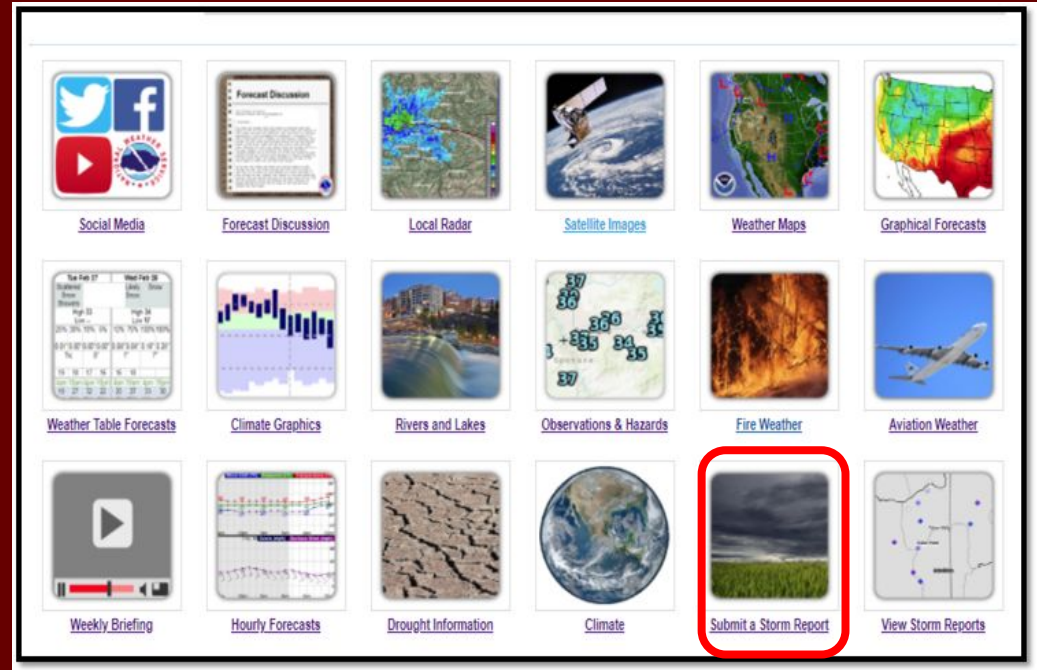
Alerting the NWS to local weather

Report Type -> Details -> Location -> Review and Send

Please select a report type ▼

Back Next

[Privacy policy for weather reports](#)



Share weather data - Social Media

Twitter



- @NWSSpokane
- #wawx & #idwx
- Share reports & pictures
- Monitored 24/7

Facebook

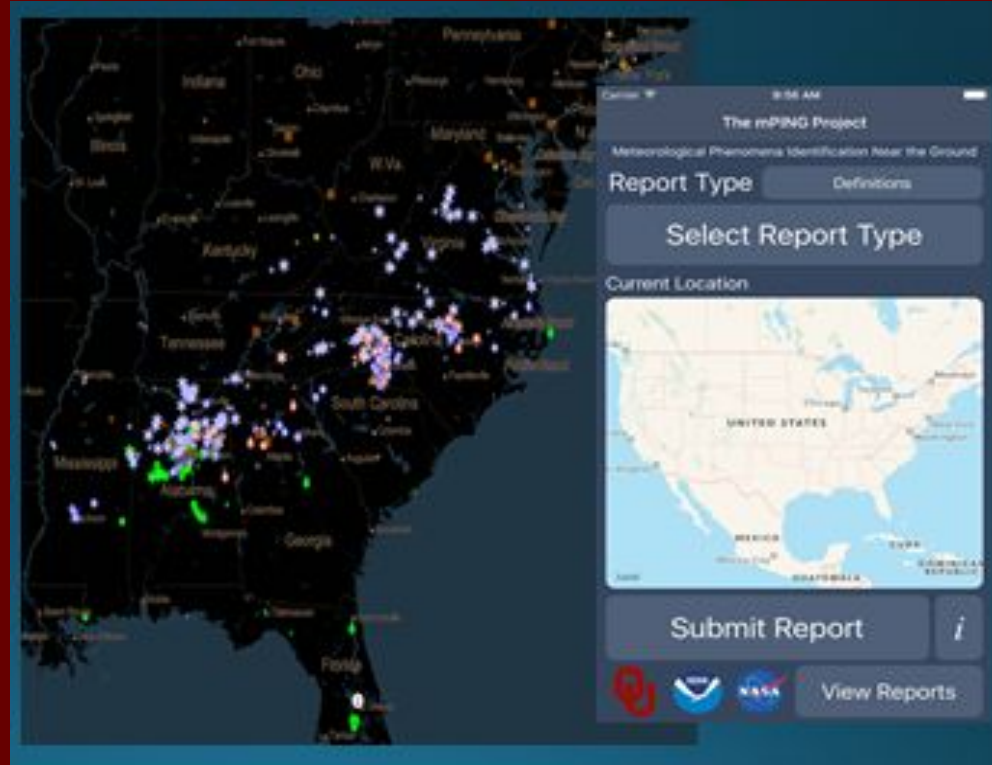


- NWS Spokane
- Send reports & pictures
- Monitored 24/7



Share weather data - mPING

- Smartphone App
- Available on IOS and Android
- Reports sent to NWS
- Reports are anonymous
- Crowdsourcing
- Very easy to use
- <https://mping.nssl.noaa.gov>



Share weather data - Email Photos

nws.spokane@noaa.gov



If ARES/RACES Hams, relay report to your central collection point.



National Weather Service - Spokane, WA

www.weather.gov/Spokane



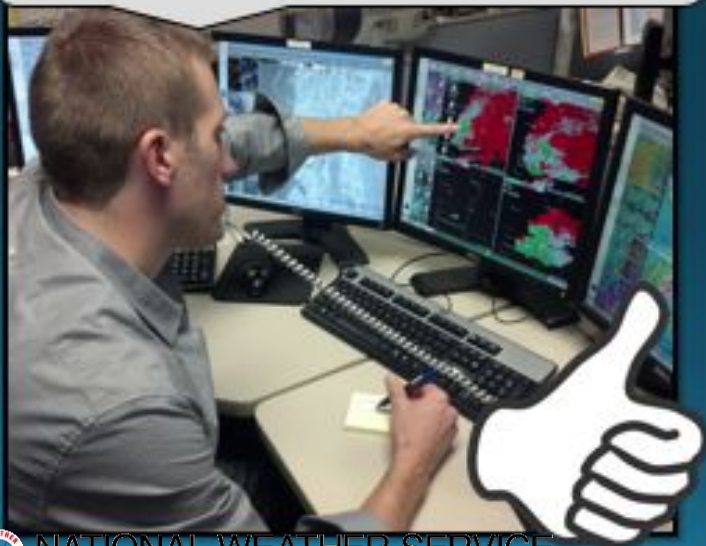
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Examples of Spotter Reports

Good Spotter Report

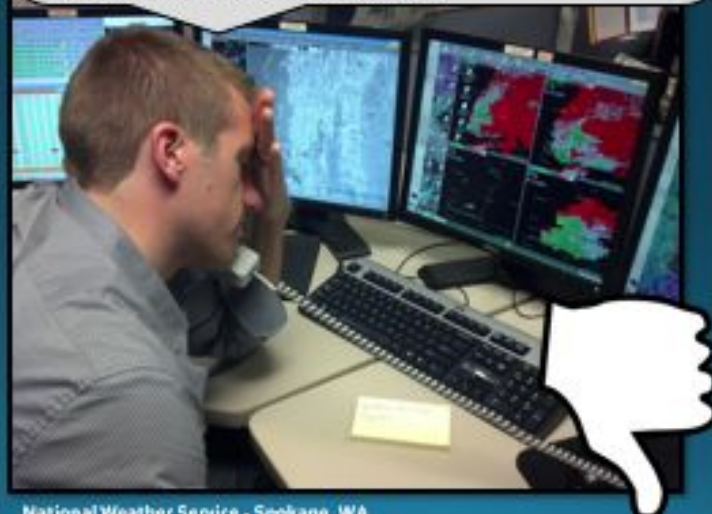
This is Tom Smith, Spotter Spokane #25 calling from my home on the South Hill. There is currently large hail falling. I measured one stone and it's about the size of a quarter. It began about 30 minutes ago.



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Needs Improvement

Hi there, how are you doing? Who is this?Well hi Steve! I'm a spotter in Okanogan County. I see lightning to the north and it rained here a little bit ago. The news is saying it's much worse to the south. Are we going to get another thunderstorm?How long is it supposed to last? How's your evening going?



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Keep in Mind – We may contact you

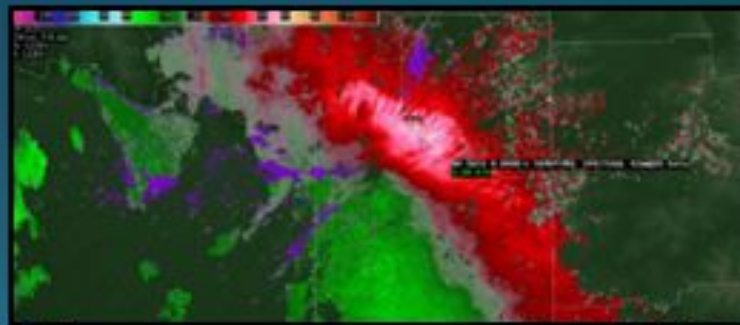
As a registered weather spotter, you'll share your phone number with the NWS.

If we see severe or hazardous weather near your location....

We will likely try to call and get information on what you are experiencing (ground truth) based on what is seen on radar



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www.weather.gov/Spokane



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Emails are Important

Besides a phone number, it's important to keep emails current.

You will likely be notified the day before/day of by email when there is a WIDESPREAD Severe Weather Risk/Thunderstorm Outbreak

We send periodic emails to alert you of the quarterly newsletter and upcoming training opportunities.



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National Weather Service Spokane, WA

www.weather.gov/Spokane



#3 Poll question

What would be your preferred way to send reports to the NWS?



Thunderstorm Hazards

- Moisture
- Lift
- Instability
- Vertical Wind Shear



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www.weather.gov/Spokane



Ingredient #1: Moisture

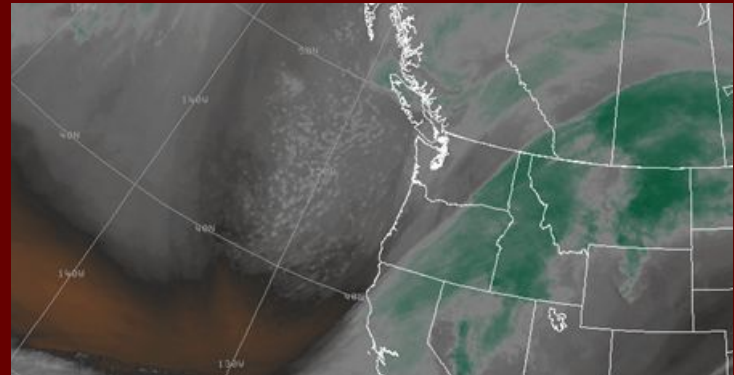
Forms the clouds and precipitation associated with thunderstorms

Primary Sources: Pacific Ocean

Occasionally: Gulf of California/Mexico during Monsoon Season

Monitor with satellite, upper level soundings and surface observations

Terms: Precipitable Water, Dewpoint, Relative Humidity



Ingredient #2: Instability

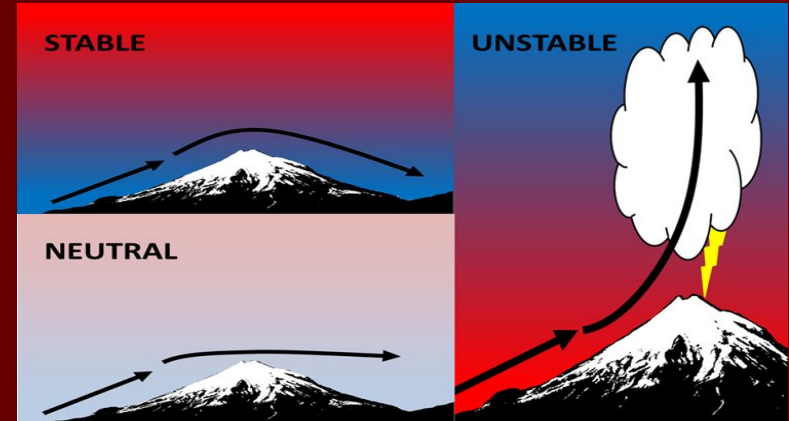
How the atmosphere naturally mixes

Unstable: warm moist air near the ground with cold air above

Stable: cold air at the surface and warm air above

Monitor with upper level soundings and surface observations

Terms: CAPE, Lifted Index, Lapse Rates



Ingredient #3: Lifting Mechanism

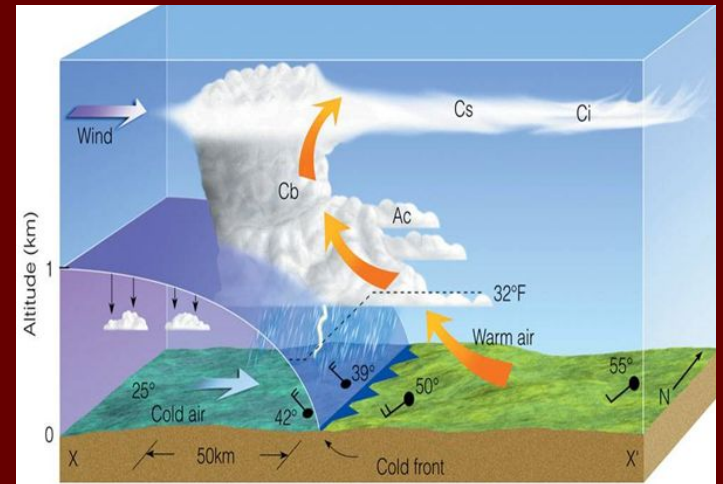
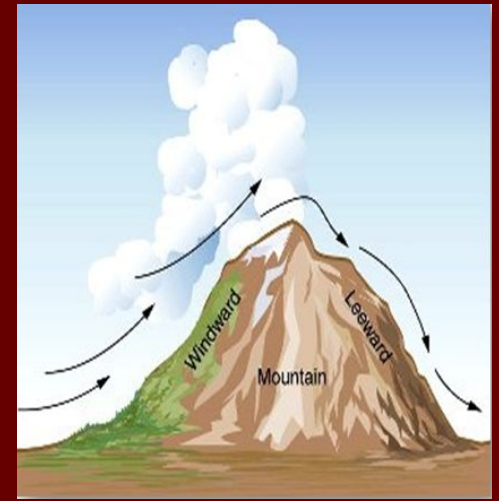
Something to force the air upward in the atmosphere.

Mountains/Terrain: air forced up a slope

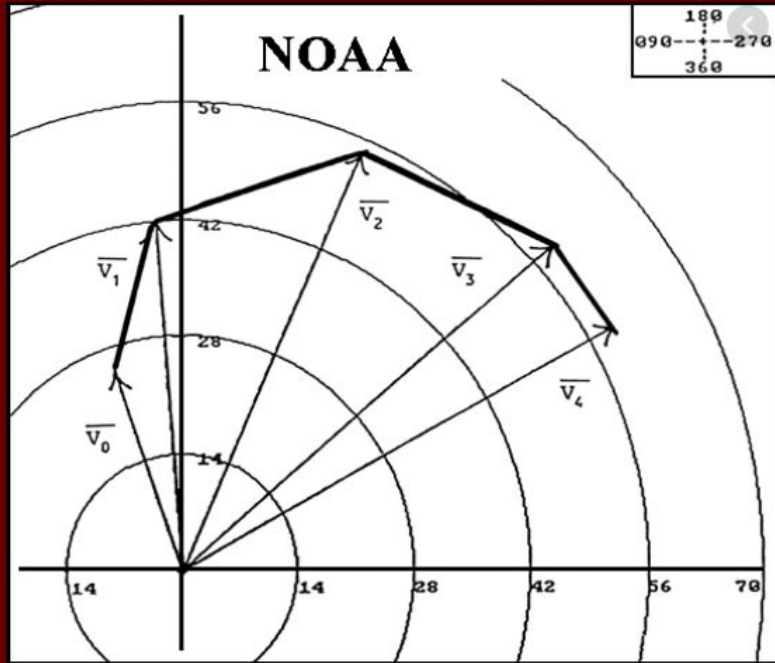
Cold Front: air is forced up by a frontal boundary

Monitor with satellite, radar, upper level soundings and surface observations

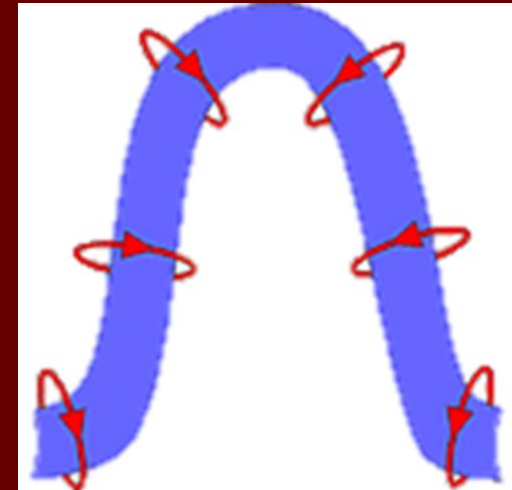
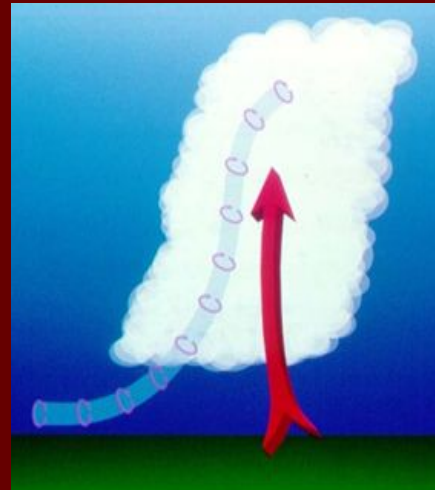
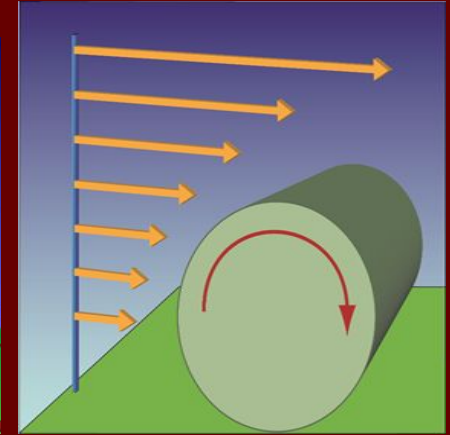
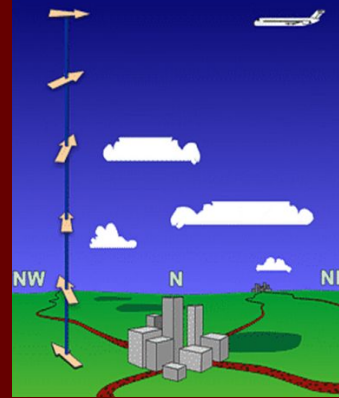
Terms: vertical velocity, vorticity, fronts



Ingredient #4: Wind Shear



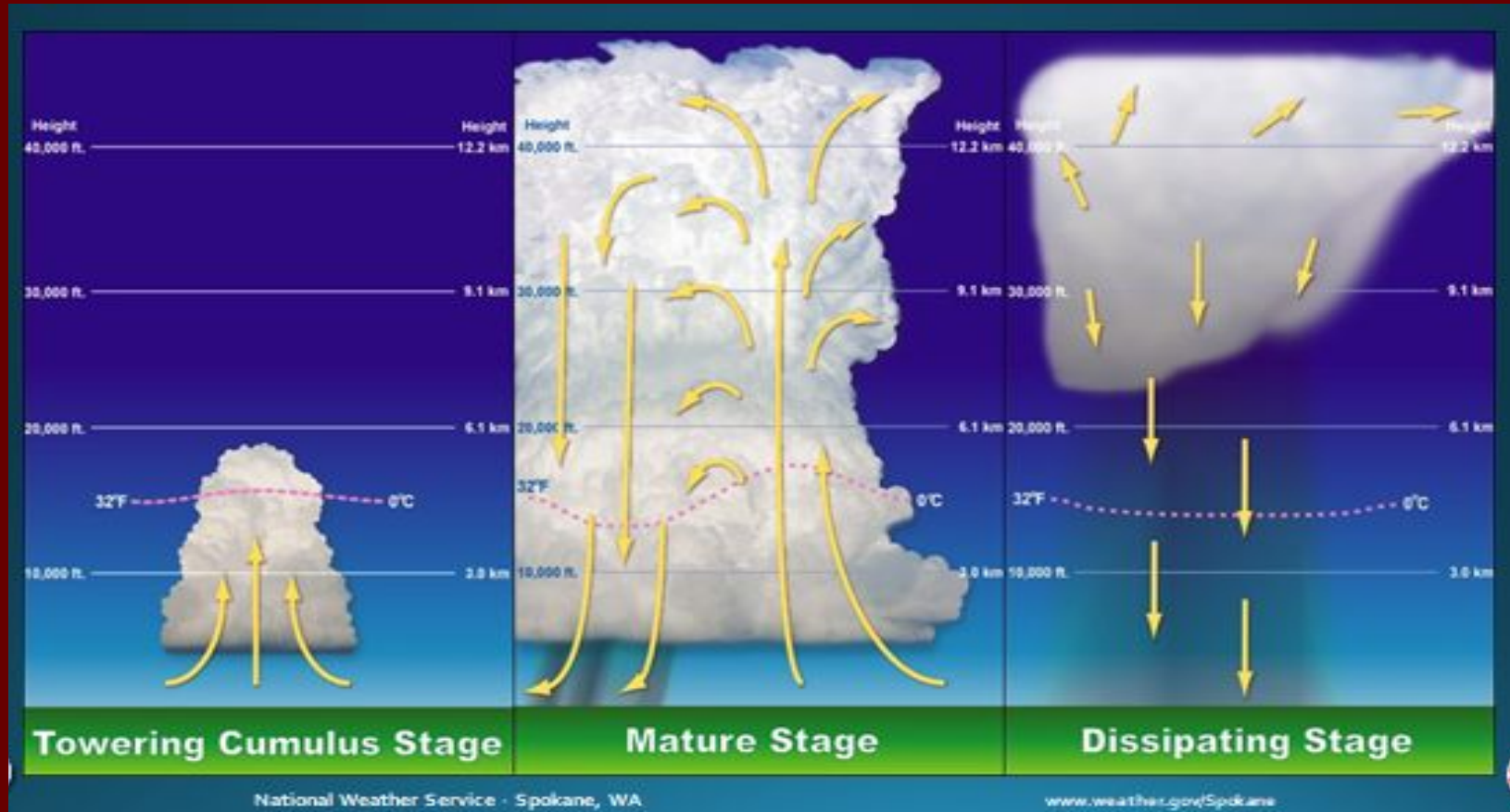
Winds / Vents		
Height / Hauteur (km)	Dir	Speed / Vitesse
Sfc	161°	25
1	175°	42
2	204°	54
3	229°	59
4	241°	59



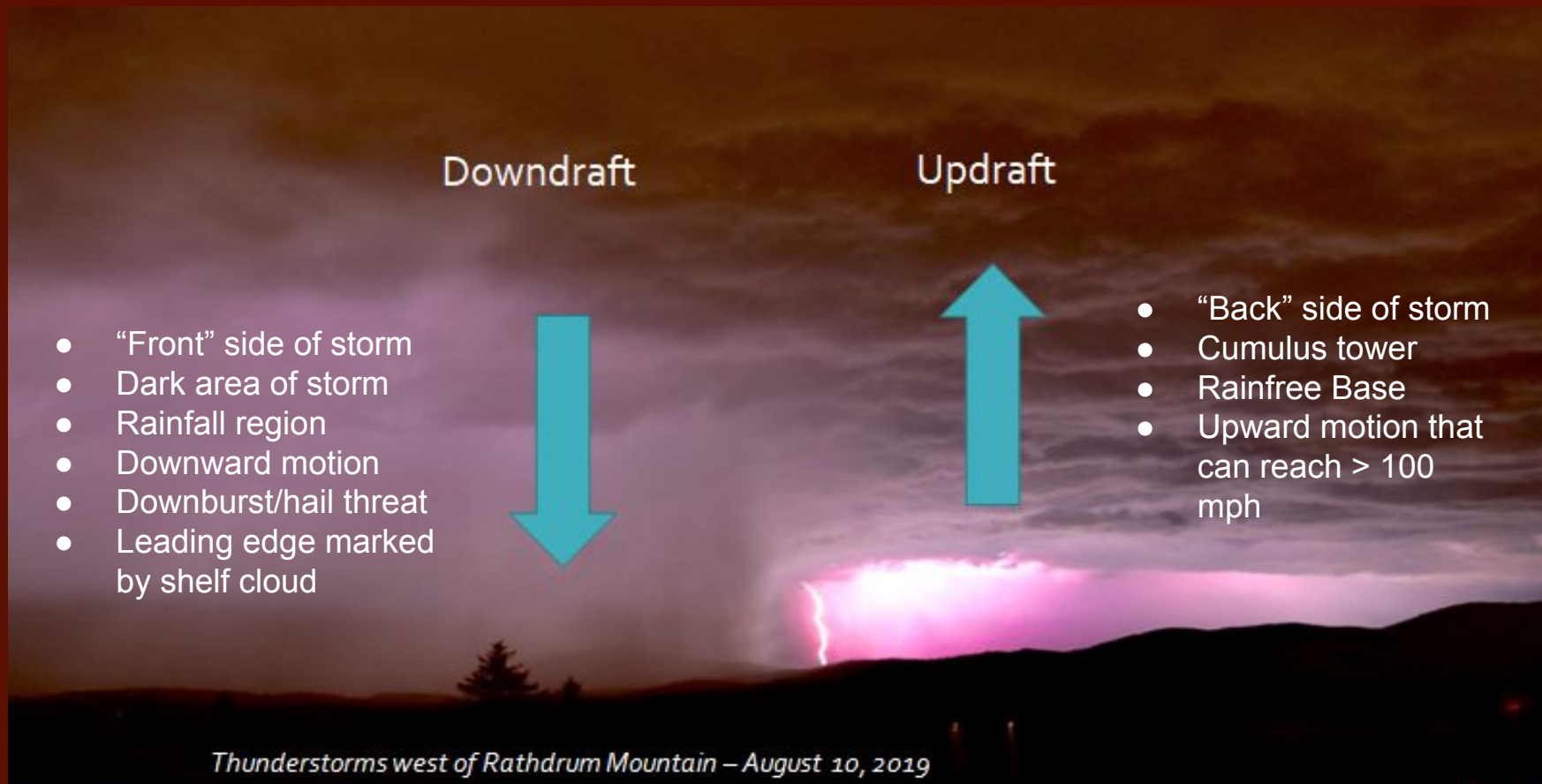
S-L-I-M – Basic Thunderstorm Elements

Shear	Lift	Instability	Moisture
Changing wind speed and direction with height	Mechanism to force air upwards	"Energy" for thunderstorms	Obviously!
Helps storms become better organized, increasing severity and longevity	Creates a focus for where storms can develop	Ability for air to rise or sink as storms develop	Needed to produce clouds and storms
Common ahead of or along a front	Cold Front, Warm Front, Leftover storm boundary, Lake Breeze	Warm surface, cool upper levels (cools at a very fast rate as you go up)	Use Dew Point

Stages of a Thunderstorm



Thunderstorm Basics



What is a Severe Thunderstorm?

Winds \geq 58 mph or Wind Damage



Hail $>$ 1" in diameter



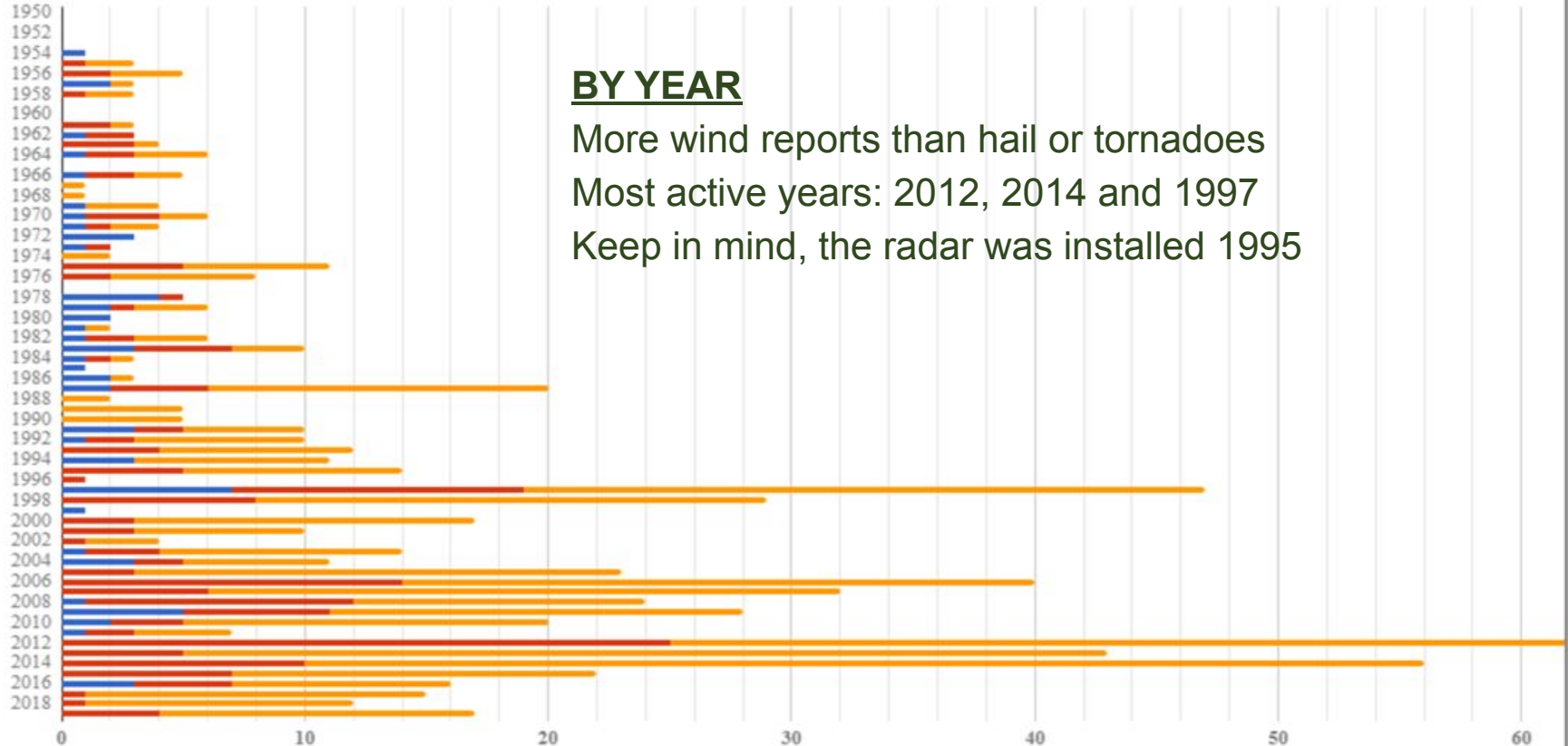
Tornado



- Less than 10% of all thunderstorms are Severe
- Though Lightning is ALWAYS extremely dangerous, the amount of lightning does not make a storm SEVERE.

Local Severe Weather Climatology

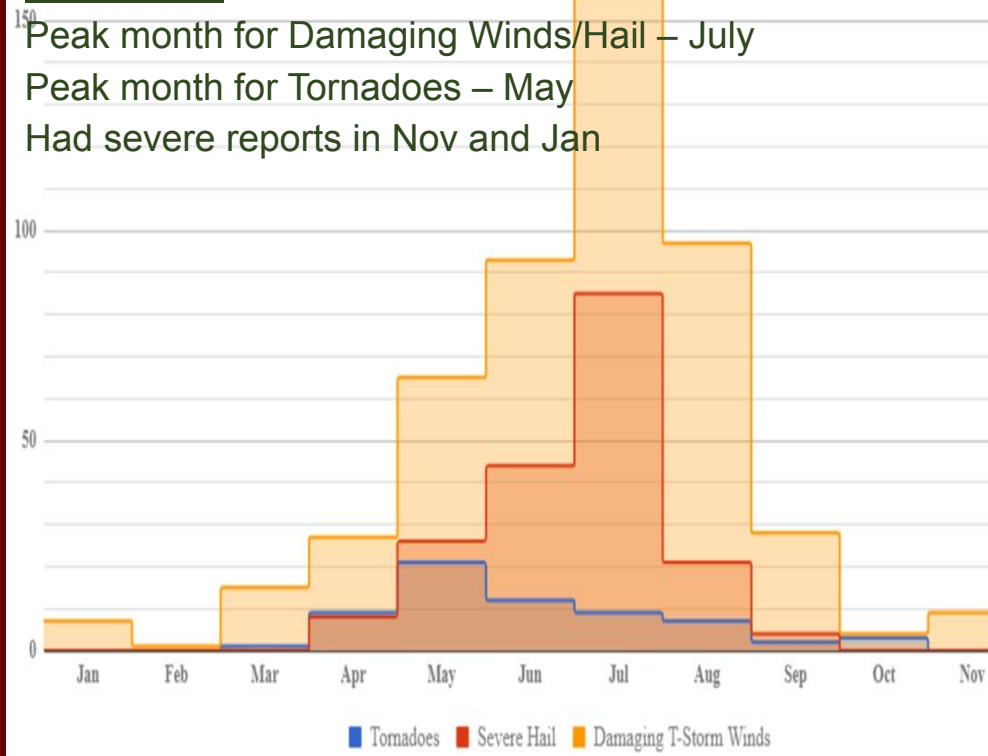
■ Tornadoes ■ Severe Hail ■ Severe T-Storm Winds



More Local Severe Weather Climatology

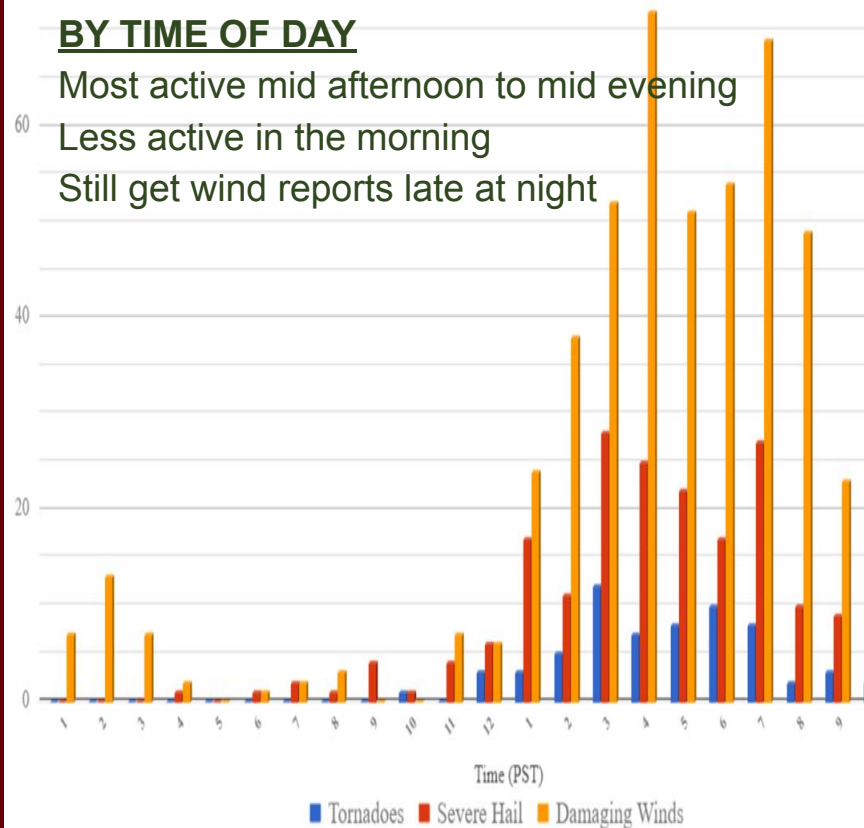
BY MONTH

Peak month for Damaging Winds/Hail – July
Peak month for Tornadoes – May
Had severe reports in Nov and Jan



BY TIME OF DAY

Most active mid afternoon to mid evening
Less active in the morning
Still get wind reports late at night



#4 Poll Question

What would be a good ingredient for thunderstorm development?



Types of Thunderstorms

Single Cell



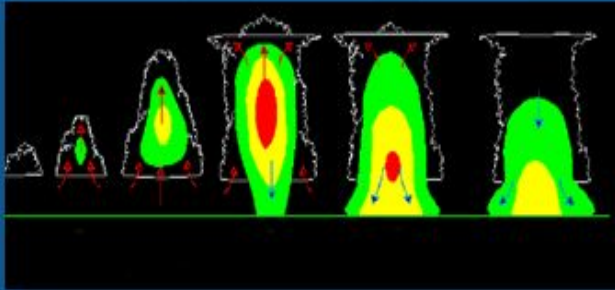
Multi-Cellular



Supercell



Single Cell Thunderstorm



Mostly Non-Severe

Life Cycle of < 30 minutes

May Contain Small Hail
& Gusty Winds

Heavy Rain

Report heavy downpours or long periods of steady rain
Give specific locations - streets and creeks

- 0.50"+ in 1 hour - convective
- 1.0" in 12 hours or 1.5"+ in 24 hours - stratiform



Flooding and Flash Flooding

Rising water on rivers, streams & low lying areas

Give specific locations of streams & streets



Turn Around, Don't Drown



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Mud and Debris Flows

Water-saturated rock, mud and debris moving down a slope

Give specific locations, roadways or intersections

Post-fire Floods



Multicell Thunderstorms

Overall Severe Weather
Threat Level:

Low - Moderate

Wind



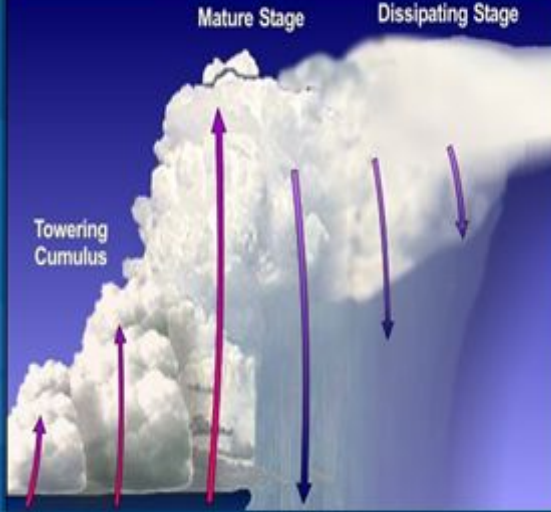
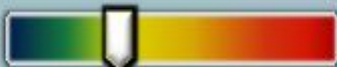
Hail



Heavy
Rain



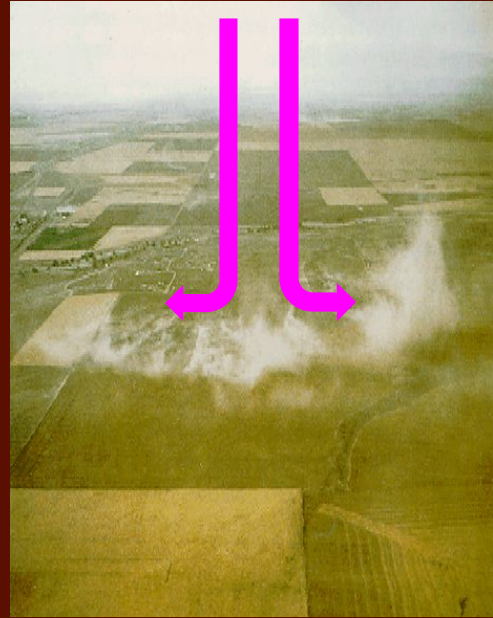
Tornado



- Flash flooding due to slow movement
- Downbursts, straight-line winds, small-med sized hail, lightning



Downburst & Straight Line Winds



Microburst: affecting an area *less than 2.5 miles* across.

Macroburst: winds extending in excess of *2.5 miles* across.

Evaporative cooling causes the air parcels to become heavy/more dense.

Dust Storms

- Prolonged dry spell + strong winds + plowed fields
- Sudden reduction in visibility
- Give locations of roads and intersections
- Also called Haboobs

April 27, 2020 - Dusty



Harrington - Aug 2014



April 11, 2020 - Ritzville



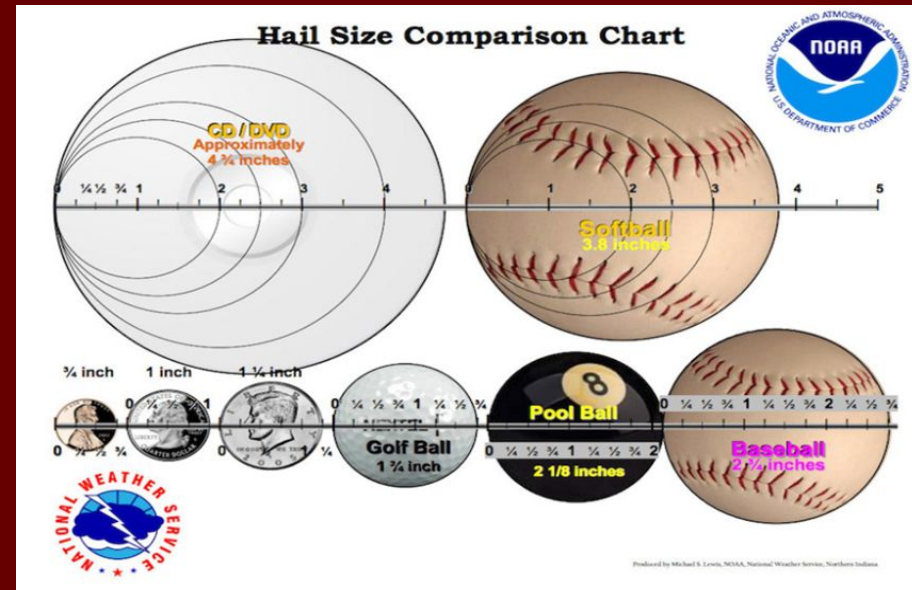
Harrington - Aug 2014



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Hail

- Strong updraft keeps chunks of ice aloft
- Circulated within a storm and collects layers of water and freezes
- Can fall to the ground at > 100 mph
- Severe hail ≥ 1 " diameter
- Always report the largest Hailstone you see in the pile.



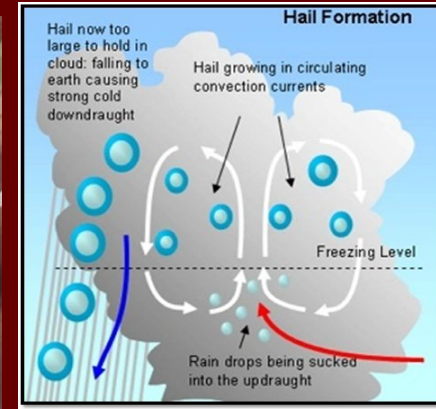
Naples, ID - May 2020



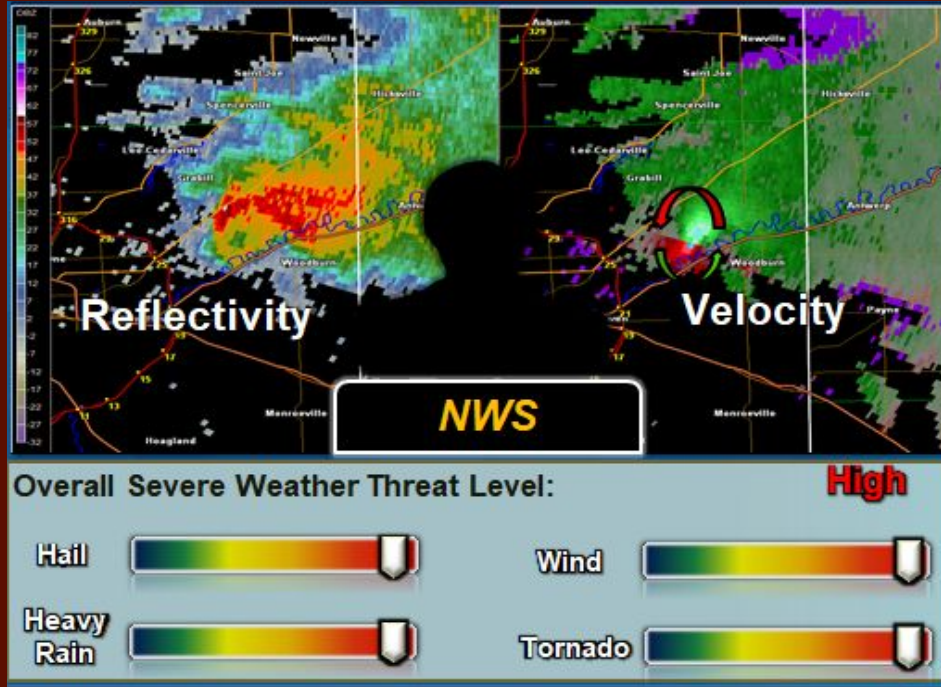
July 2019 - Metaline, WA



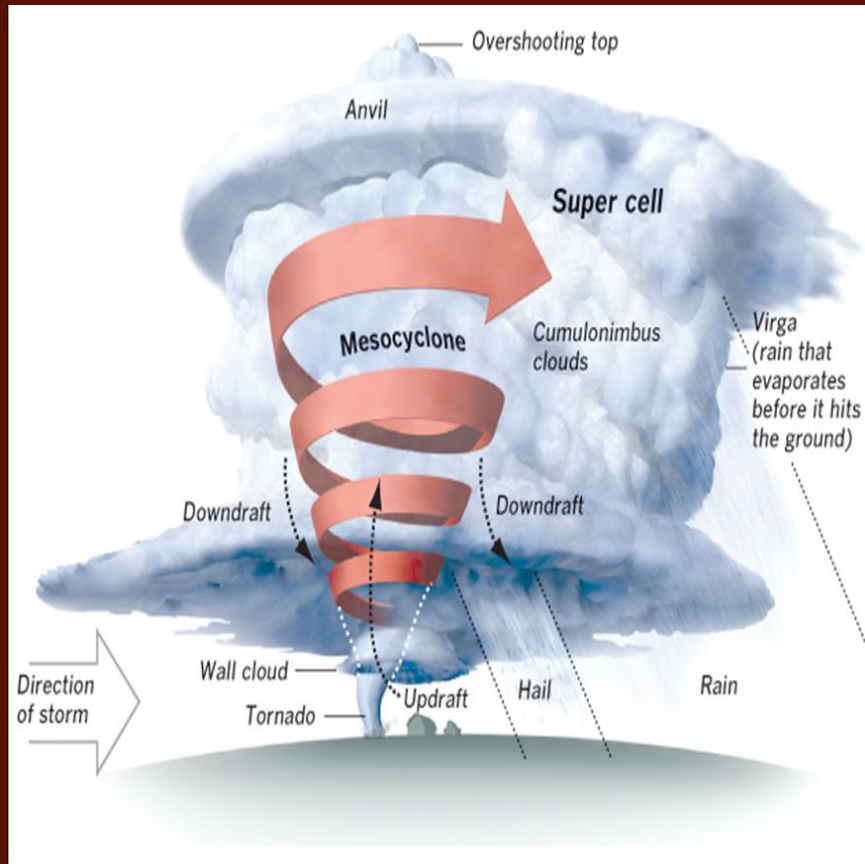
Spokane -
July 2016



Supercell Thunderstorms



Supercell Thunderstorm Clues



Overshooting Tops



Cauliflower shaped towers



Mesocyclone or Wall Cloud



Cloud Types

Scud clouds - ragged



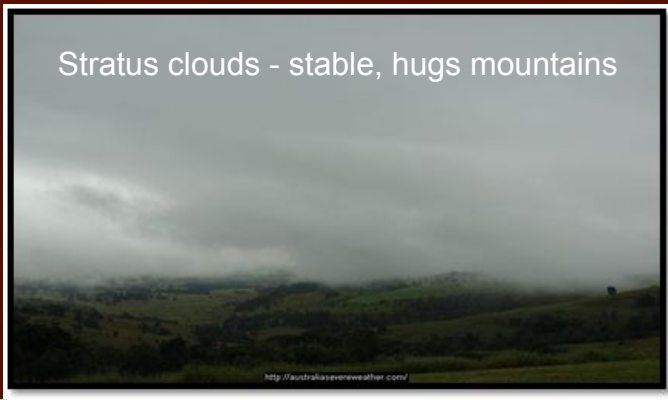
Cumulus



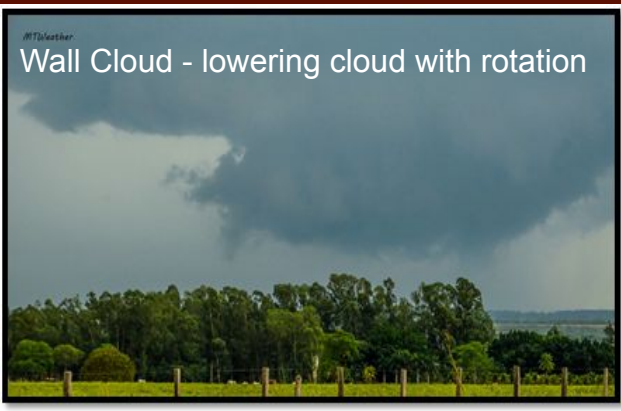
Mammatus clouds



Stratus clouds - stable, hugs mountains



Wall Cloud - lowering cloud with rotation



Towering Cumulus



Tornado

A violently rotating column of air, attached to a thunderstorm and touching the ground.

Typical Inland NW Tornado

- Less than 5 minutes on the ground
- 100 yards in diameter
- ¼ mile track
- Max wind speeds of 85-115 mph
- Mostly EF0 to EF1

Mold - July 2016



Airway Heights - July 2016

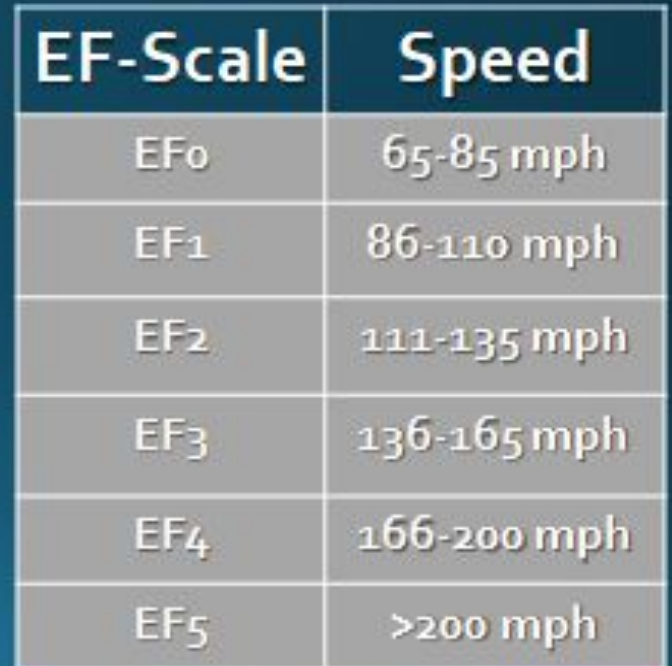


Airway Heights - May 2004

Spokane - July 2016



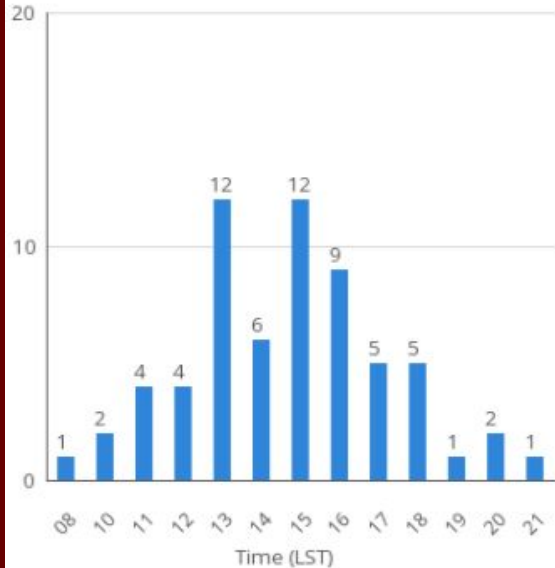
The Enhanced Fujita Scale



Inland NW Tornado Stats ~ 64 reports (1936-2016)

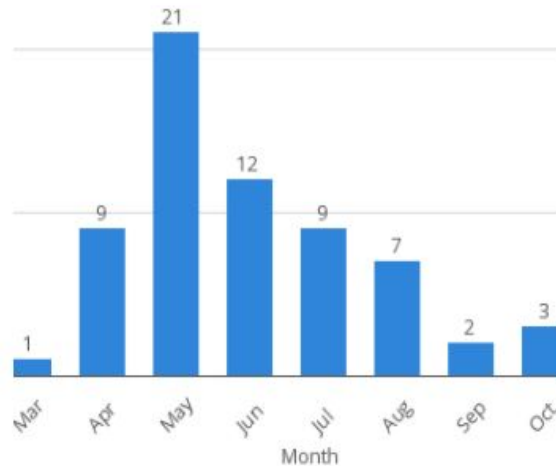
Tornadoes by time of day

Total number of tornadoes by time of day



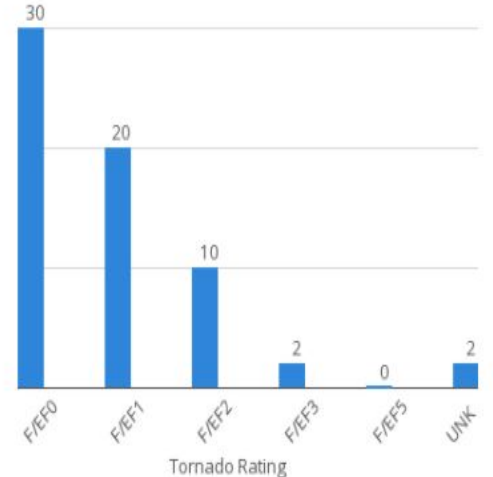
Tornadoes by month

Total number of tornadoes by month



Tornadoes by rating

Total number of tornadoes by RATING from 1936 to 2016



Tornado Tracks, 1950-2017

☒ Show Touchdown Points

Filter by Magnitude:

- ☒ F/EF 0
- ☒ F/EF 1
- ☒ F/EF 2
- ☒ F/EF 3
- ☒ F/EF 4
- ☒ F/EF 5

Filter by Year Range:

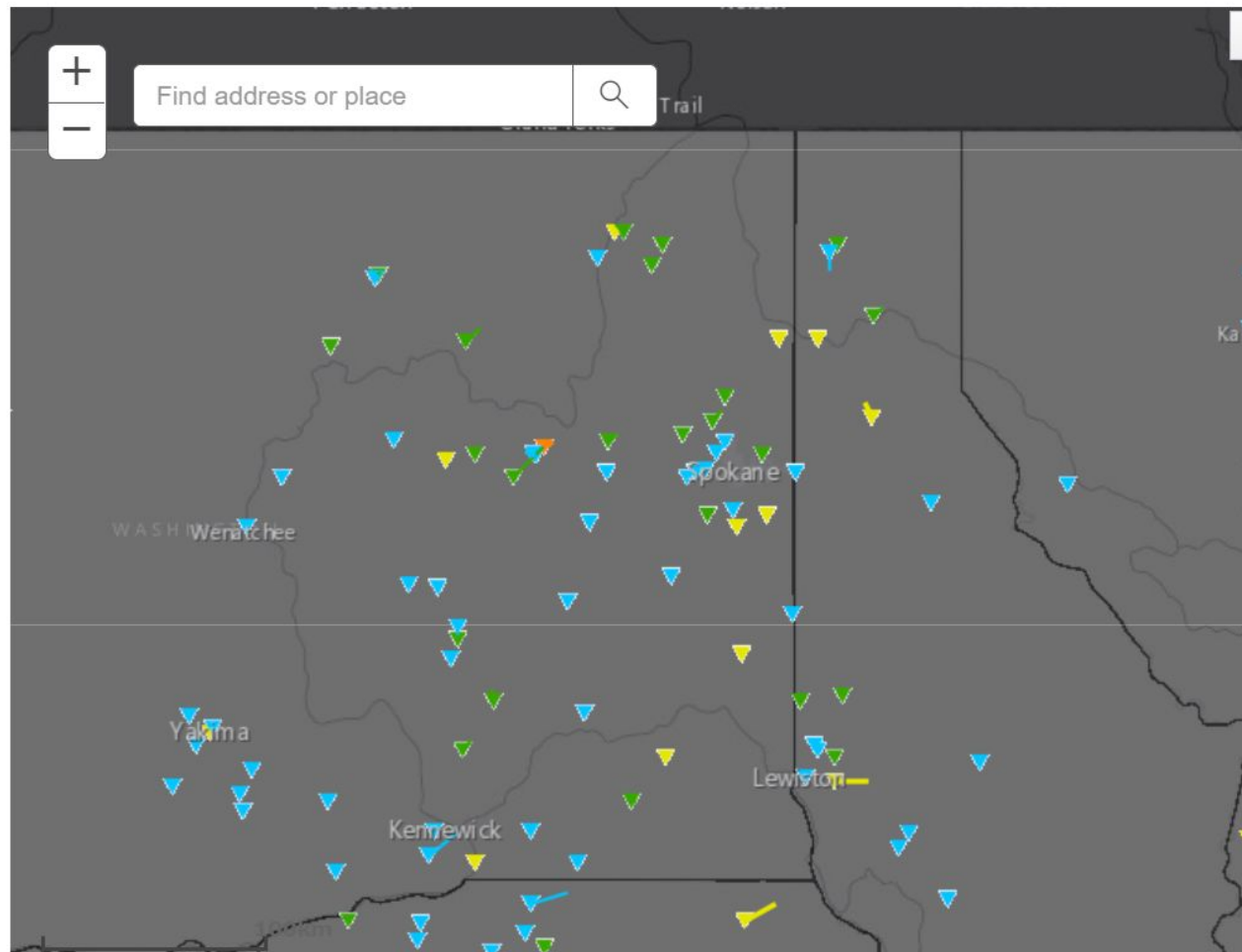
1950 through 2017

Filter by Month:

All Months

Filter by Casualties:

- ☐ Injuries > 0
- ☐ Fatalities > 0



What about Funnel Clouds & Dust Devils?

- Funnel clouds stay aloft attached to storm cloud
- Dust devils start at the ground and extend upward
- Tornadoes extend from storm cloud to the ground
- In doubt, check for cloud cover and debris on ground
- Take a picture and share!



#5 Poll Question

Identify this cloud.






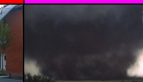


Stay Informed

National Storm Prediction Center

www.spc.noaa.gov

Understanding Severe Thunderstorm Risk Categories

THUNDERSTORMS (no label)	1 - MARGINAL (MRGL)	2 - SLIGHT (SLGT)	3 - ENHANCED (ENH)	4 - MODERATE (MDT)	5 - HIGH (HIGH)
No severe* thunderstorms expected	Isolated severe thunderstorms possible	Scattered severe storms possible	Numerous severe storms possible	Widespread severe storms likely	Widespread severe storms expected
Lightning/flooding threats exist with all thunderstorms	Limited in duration and/or coverage and/or intensity	Short-lived and/or not widespread, isolated intense storms possible	More persistent and/or widespread, a few intense	Long-lived, widespread and intense	Long-lived, very widespread and particularly intense
					

* NWS defines a severe thunderstorm as measured wind gusts to at least 58 mph, and/or hail to at least one inch in diameter, and/or a tornado. All thunderstorm categories imply lightning and the potential for flooding. Categories are also tied to the probability of a severe weather event within 25 miles of your location.



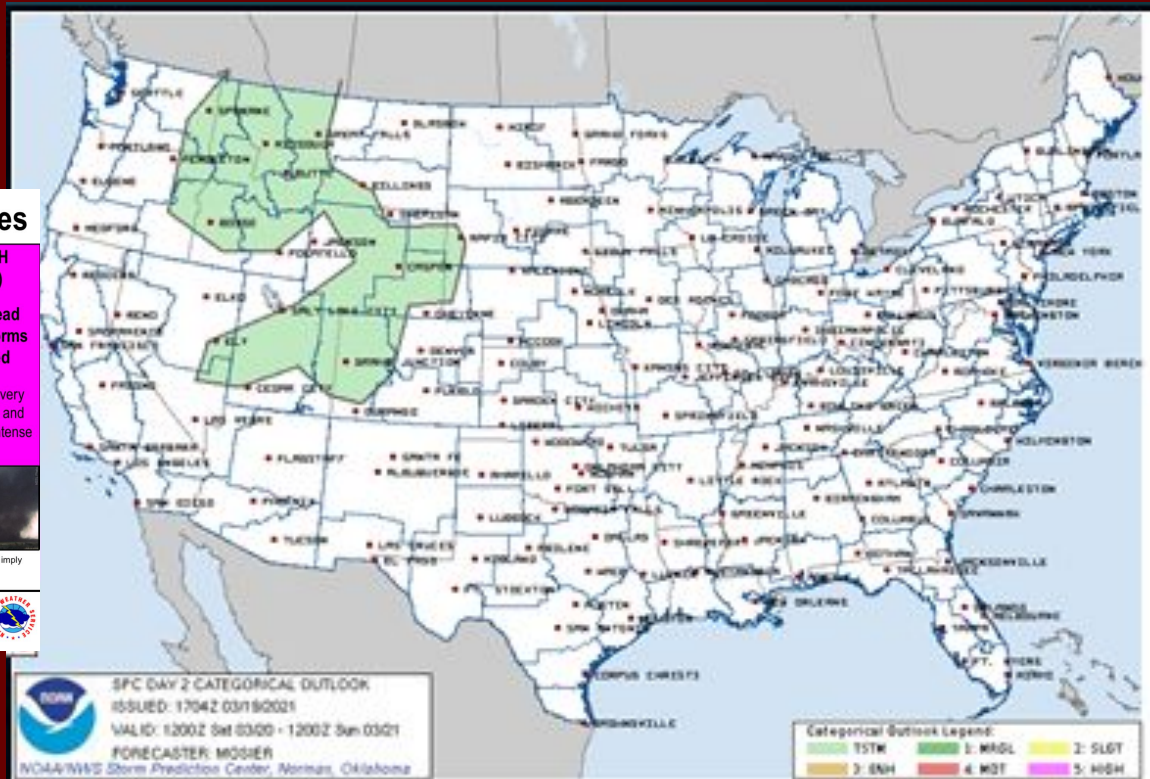
National Weather Service

www.spc.noaa.gov



SPC DAY 2 CATEGORICAL OUTLOOK
ISSUED: 1704Z 03/19/2021
VALID: 1200Z Sat 03/20 - 1200Z Sun 03/21
FORECASTER: MOGIER
NOAA/NWS Storm Prediction Center, Norman, Oklahoma

Categorical Outlook Legend:
TSTM 1: MRGL 2: SLGT
3: ENH 4: MDT 5: HIGH



NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Stay Informed

Do you have the time?

- Many weather products use the UTC/GMT/Z time zone
- UTC = PDT + 7 or PST +8
 - 10:00 AM PDT is 17:00 UTC
 - 10:00 AM PST is 18:00 UTC
- 00z and 12z are common times for models, weather balloons and other important weather information



00z = evening

12z = morning

24 hour clock is used for UTC/Z

Based off the lines of longitude

0 degrees = Greenwich, England



Stay Informed

NWS Spokane Web Page

www.weather.gov/Spokane

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HOME FORECAST PAST WEATHER SAFETY INFORMATION EDUCATION NEWS SEARCH ABOUT

Local forecast by
City, ST or ZIP code

[Location Help](#)


News Headlines

- Spring 2021 Virtual Weather Spotter Training - Register Here!
- NOAA Weather Radio Technical Issues - Degraded service at Mt Spokane transmitter
- Weather Watcher Quarterly Newsletter - Spring 2021


MY FORECAST
Spokane WA



Clear
46°F
8°C [Get Detailed info](#)

Today


Sunny
High: 59°F

Tonight


Mostly Clear
Low: 33°F [change location](#)

NWS Forecast Office Spokane, WA
[Weather.gov](#) > Spokane, WA




Spokane, WA
Weather Forecast Office

Current Hazards Current Conditions Radar Forecasts Rivers and Lakes Climate and Past Weather Local Programs

Weather this week



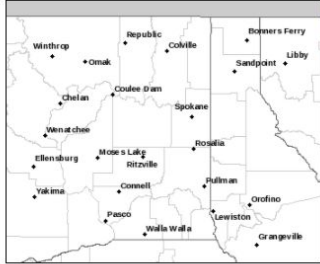
Seasonal & Settled Before Mid-Week Change
10331827 4:12 PM - Sunday, April 4, 2021

MON	TUE	WED	THU	FRI
				
50°s - low 60°s	High 50°s ~ 60°s	60°s	50°s - low 60°s	High 40°s ~ 50°s

[Show Caption](#)

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Click a location below for detailed forecast.



Watches,
Warnings &
Advisories



There are no watches,
warnings, or advisories at
this time.


Zoom
Out
Zoom
In

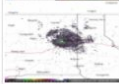
Last Map Update: Mon, Apr. 5, 2021 at 10:44:15 am PDT

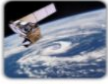
Text Product Selector (Selected product opens in current window)


Latest Text Products Issued by OTX

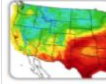

Social Media



Forecast Discussion



Local Radar



Satellite Images



Weather Maps



Graphical Forecasts



Weather Table Forecasts



Climate Graphics


Rivers and Lakes



Observations & Hazards



Fire Weather



Aviation Weather

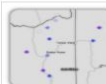

Weekly Briefing


Hourly Forecasts


Drought Information


Climate


Submit a Storm Report


View Storm Reports

Stay Informed

NWS Spokane Web Page

www.weather.gov/Spokane

NATIONAL WEATHER SERVICE
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Local forecast by "City, ST or ZIP code"
Enter location...
[Location Help](#)

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- [Weather Watcher Quarterly Newsletter - Spring 2021](#)

MY FORECAST
Spokane WA

NWS Forecast Office Spokane, WA
[Weather.gov > Spokane, WA](#)

Spokane, WA
Weather Forecast Office

[Current Hazards](#) [Current Conditions](#) [Radar](#) [Forecasts](#) [Rivers and Lakes](#) [Climate and Past Weather](#) [Local Programs](#)

Weather this week

Clear
46°F
8°C [Get Detailed info](#)

Today
Sunny
High: 59°F

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[change location](#)

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MON	TUE	WED	THU	FRI
50°s - low 60°s	High 50°s - 60°s	60°s	50°s - low 60°s	High 40°s - 50°s

[Show Caption](#)

NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Important NWS products to follow

- Hazardous Weather Outlook (HWO)
 - Daily updates on weather hazards 1-7 days out
- Forecast Computer Models
 - HRRR, GFS, ECMWF
- Radar Data
- River and Lake - forecasts

Stay Informed

NWS Spokane Web Page

www.weather.gov/Spokane

Important NWS products to follow

- Area Forecast Discussion (AFD)
 - Forecasters thinking/confidence
- Radar images
- Satellite Images
- Current Observations
- Submit a Spotter Reports
- View Storm Reports

Click a location below for detailed forecast.

Watches, Warnings & Advisories

There are no watches, warnings, or advisories at this time.

Last Map Update: Mon, Apr. 5, 2021 at 10:44:15 am PDT

Text Product Selector (Selected product opens in current window)

Latest Text Products Issued by OTX

Forecast Discussion

Local Radar

Satellite Images

Weather Maps

Graphical Forecasts

Weather Table Forecasts

Climate Graphics

Rivers and Lakes

Observations & Hazards

File Weather

Submit a Storm Report

View Storm Reports

Weekly Briefing

Hourly Forecasts

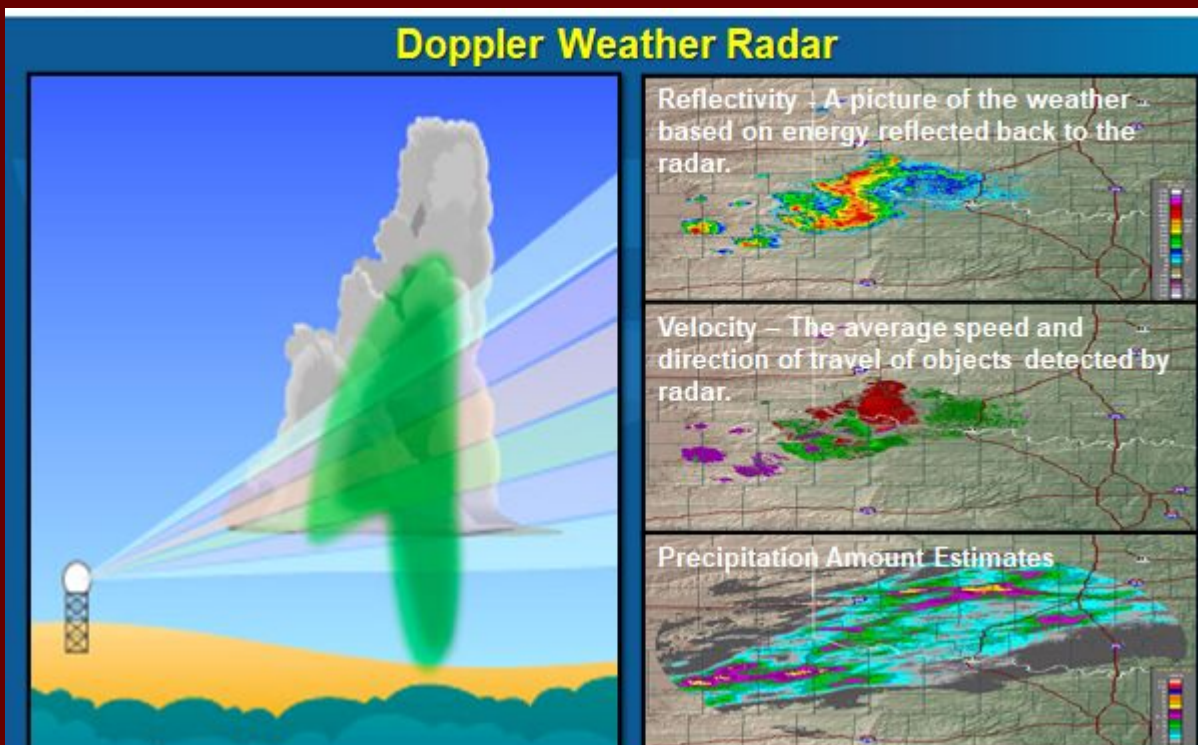
Drought Information

Climate



Basic Radar Interpretation

Updated Radar Map
Local Radar - Select Site



☑ KOTX ▾ CREF (NCR) ^ ⚠ No Alerts ▾

Select the radar product:

- Super Resolution Base Reflectivity
- Super Resolution Base Velocity
- Dual-Pol Precipitation Type
- Dual-Pol Differential Reflectivity
- High Resolution Echo Tops
- One Hour Precipitation Accumulation
- Storm Relative Motion
- Digital Storm Total
- Storm Total Precipitation
- Base Velocity
- Composite Reflectivity
- High Resolution VIL

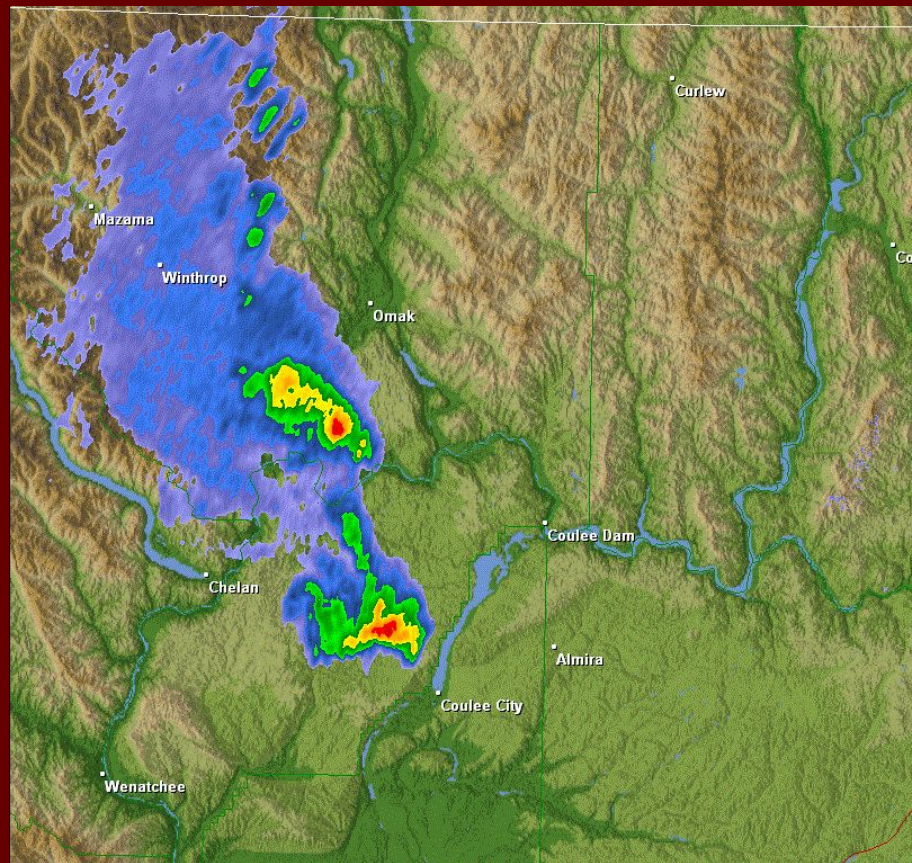
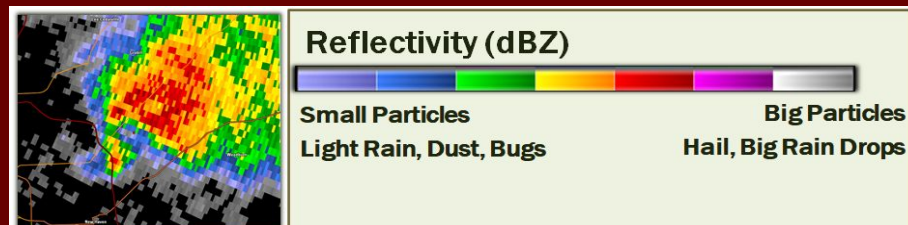
Radar Products - Reflectivity

Raw measure of how reflective targets within the beam are - typically (BUT NOT ALWAYS) indicates precipitation intensity

Measured in dBZ

“Base” or “Tilt X” = One Slice

“Composite” = Worst of all Slices



Radar Products - Velocity

Speed and direction of targets - rain, snow, hail, debris or other biological particles. Measured in knots.

Reds = outbound motion

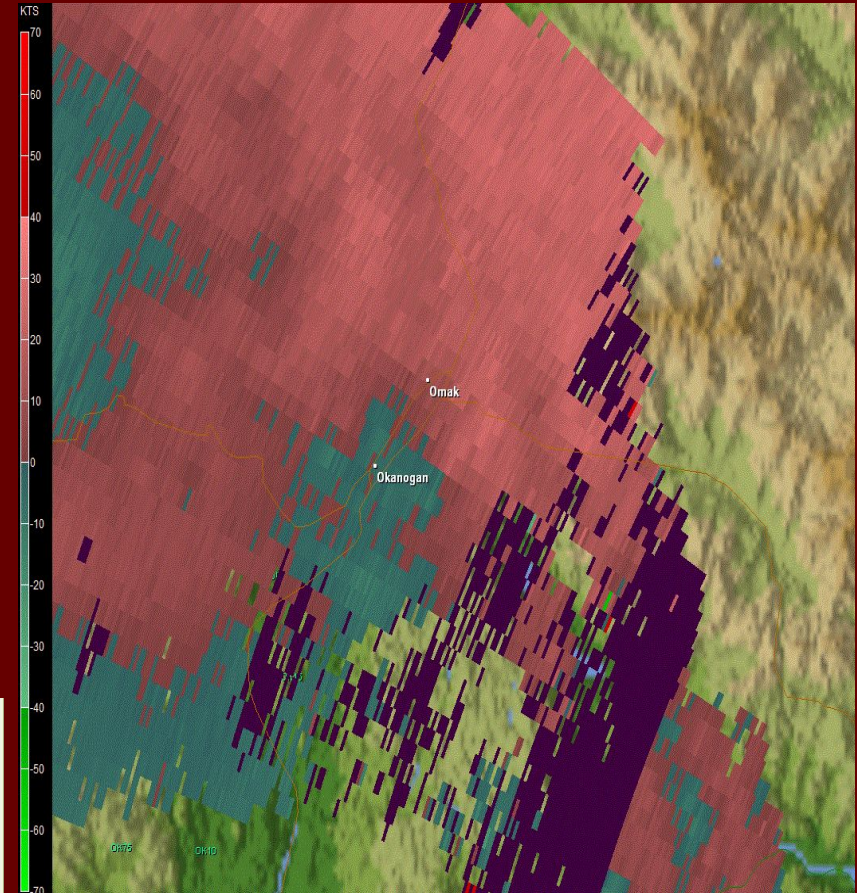
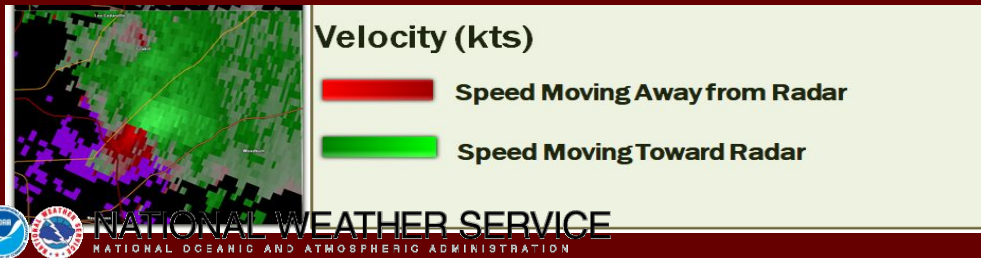
Green = inbound motion

“Base” = ground relative motion

Good for straight line winds

“Storm Relative” = storm motion removed

Good for rotation in storms

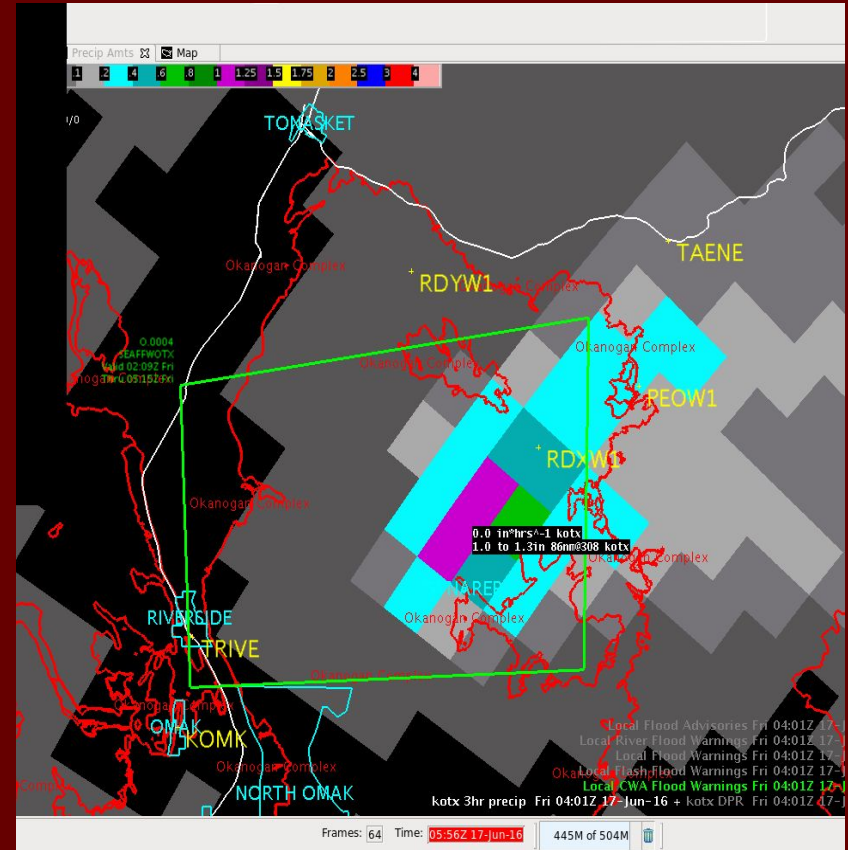


Radar Products - Precipitation

Radar estimate of precipitation reaching the ground. This can be overestimated from hail contamination

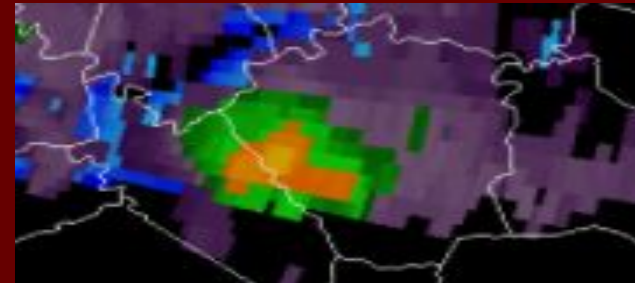
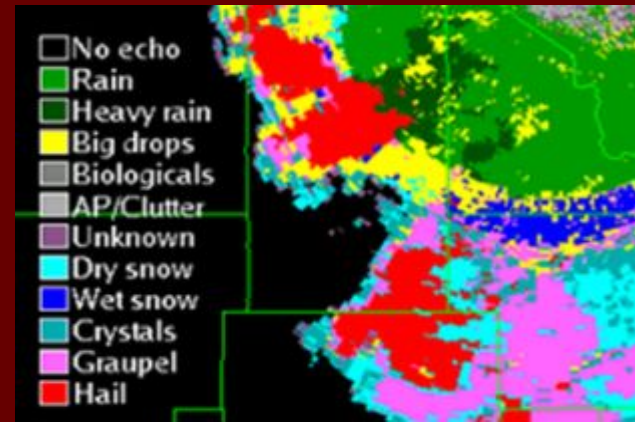
Hourly - 1 hour precipitation

Storm Total - total precipitation through the storm



Radar Products - More Products

- Precipitation Type
 - Estimate of type of precipitation
- Echo Tops
 - Estimate of height above ground of the 18 dBz echo or storm top
- Vertically Integrated Liquid - VIL
 - Estimate of the liquid water content - hail size



Cold Air Funnels - May 2020 Pullman

- No reports of damage or touchdowns
- Additional reports in Ritzville & Columbia Basin
- Weather pattern - upper level trough



Cold Air Funnel

- Circulation on Radar near I-90 where it was seen around 4:45 pm TO 4:50 pm May 26th
- “Red Shading” moving away from radar
- “Green Shading” moving away from radar

What is a “Cold Air Funnel”?

A funnel cloud that can develop from a small shower or thunderstorm when the air aloft is unusually cold (hence the name). They typically do NOT touch the ground and do not cause damage. But always be alert if you see one.



May 2015



#6 Poll question

What are some useful radar products?



Lightning

Close Enough to Hear Thunder,-
Close Enough to be Struck!

- Lightning can strike as far as 10 miles from the thunderstorm.
- More than 50% of lightning deaths occur AFTER the storm has passed

When Thunder Roars, Go Indoors

Seek Safe Shelter indoors - or vehicle if needed
Stay away from windows & doors
Don't use a corded phone or take a bath/shower



Spokane, WA April 2017



Kahlotus - May 2020



Ritzville - May 2020

Spotter Safety

Even the most careful and conscientious driver may have problems under severe weather conditions

Number 1 Threat: Driving on the highways!

- Spotters are prone to:
 - Drive with less than 100% attention
 - Drive above the speed limit
 - Drive down rain/hail covered roads
 - Make sudden stops and starts without warning
 - Drive in adverse conditions, i.e. low visibilities, strong gusty winds etc.
 - Distractions due to various in-car devices, i.e. cell phone, laptop, PDA, GPS, camera etc.

Spotter Safety - Watch for Standing Water on Roads



- Hydroplaning is a serious threat.
- During a storm, water will likely collect along the tire paths.
- If you are hearing water splashing under your car, then you are on the verge of hydroplaning, if you are not doing so already.
- Use your headlights.

Spotter Safety - Watch for Night Spotting

Be extra cautious at night

Obviously, it is more dangerous to deal with something you cannot clearly see. Storms at night present special problems for spotters and you should be extremely cautious when observing storms after dark.

Spotter Safety - Watch for Storm Damage



Stay out of damage areas

- Damage paths are full of hazards; downed power lines, jagged pieces of sheet metal, broken boards, etc.
- Avoid such places unless you have been asked to participate with cleanup or rescue efforts.
- Hindering cleanup – too many people in the way.
- Folks who have been hit by storm damage tend to be suspicious of strangers in their area.
- Gawkers are usually not appreciated and you could be taken for a potential looter.

Spotter Safety

Responsible Spotting...

- **Effective spotting is a constant learning process, and responsible spotters should always be aware of the latest science relating to severe thunderstorms and tornadoes.**
 - *Attend as many storm spotting classes as you can.*
 - *Each time you attend, you WILL learn something new.*
 - *Do additional research on your own (join blogs, forums etc)*



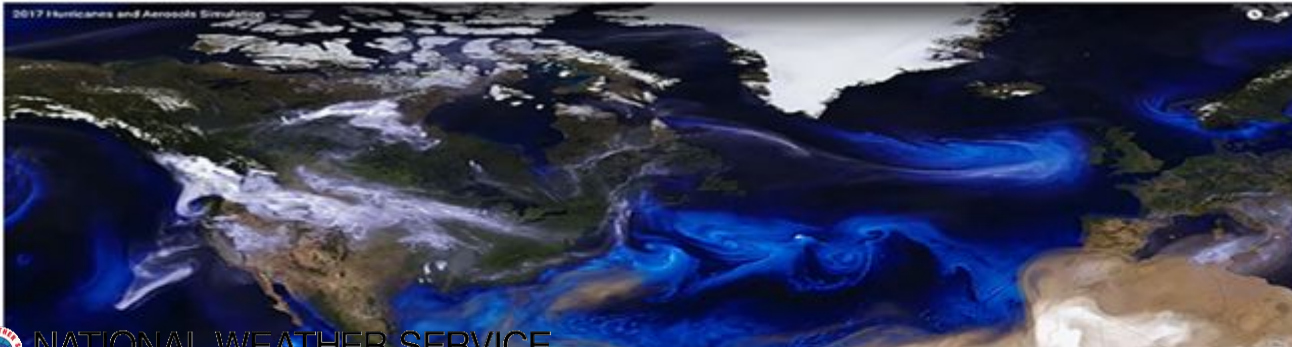
Additional Training



Spotter Resources

[www.weather.gov/
Spokane/Spotter_
Resources](http://www.weather.gov/Spokane/Spotter_Resources)

JetStream - An Online School for Weather



JetStream's Topics

- The Atmosphere
- The Ocean
- Global Weather
- Clouds
- The Upper Air
- Upper Air Charts
- Synoptic Meteorology
- Thunderstorms
- Lightning
- Derechos
- Tropical Weather
- Doppler Radar
- Remote Sensing
- Tsunamis
- The National Weather



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#7 poll question

What would be a SAFE weather spotting scenario?



Seasonal Outlook 2021

So far this year...

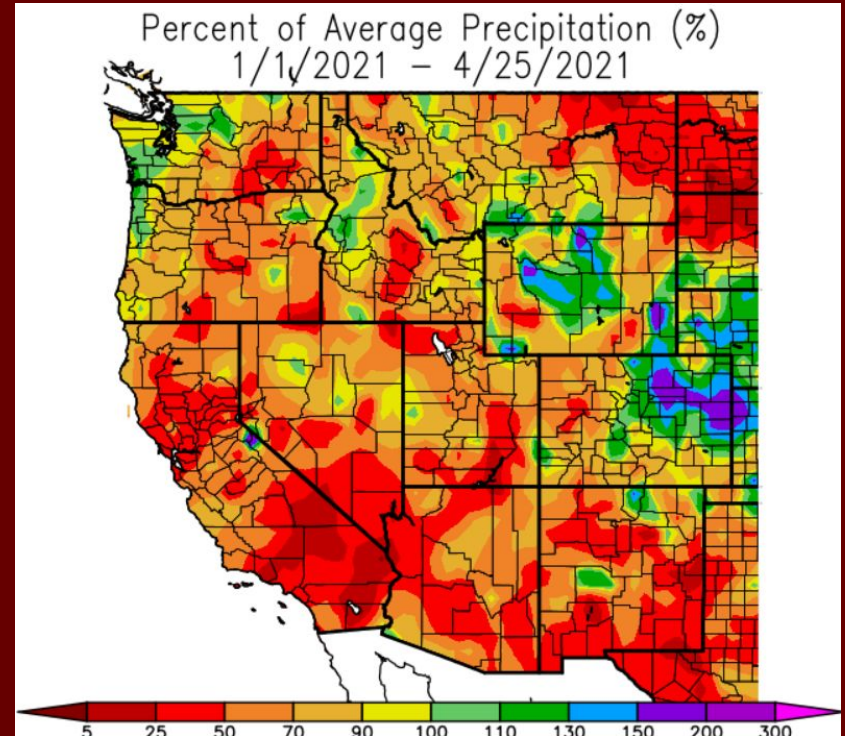
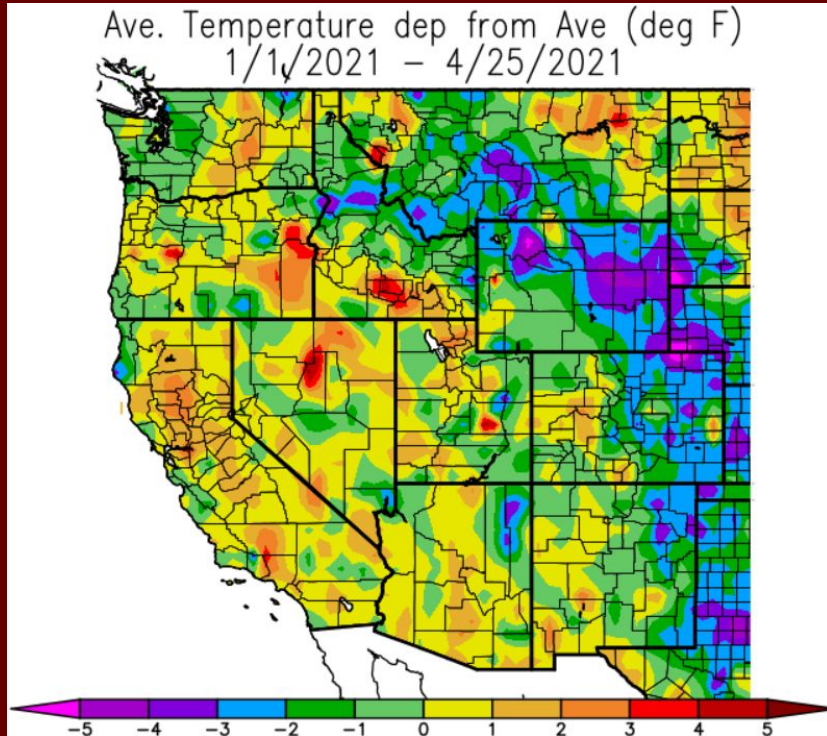
wrcc.dri.edu/

January - Mild and Wet in the north

February - Cold and Wet in the south

March - Seasonal and Dry

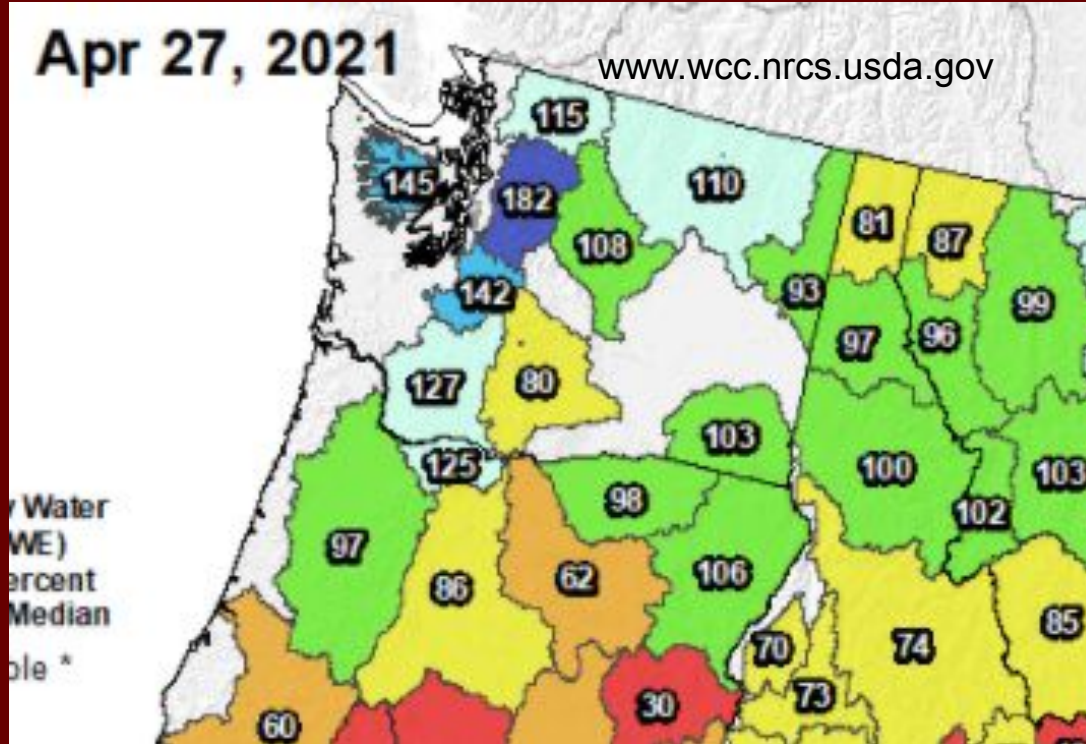
April - Dry and near seasonal



NATIONAL WEATHER SERVICE
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Seasonal Outlook 2021

Mountain Snowpack



Seasonal Outlook 2021

US Drought Monitor & Outlook

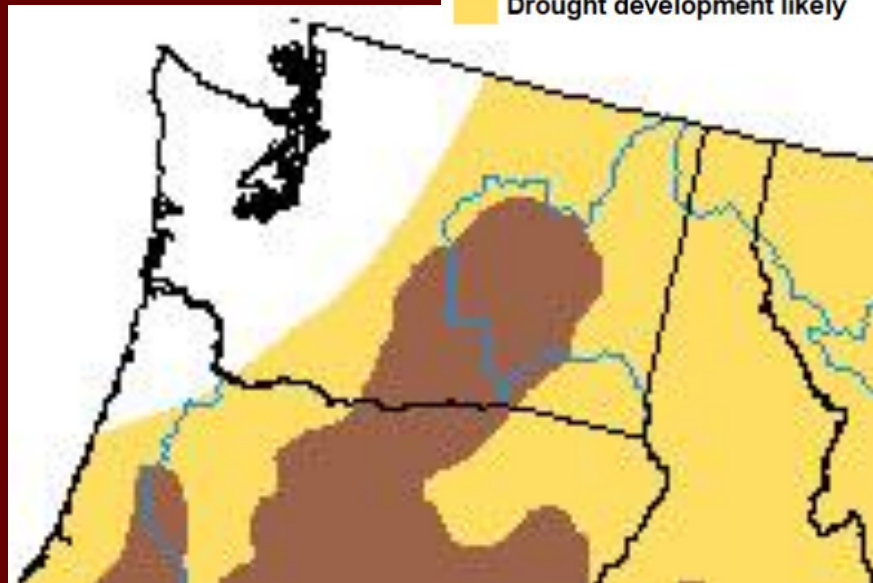
www.cpc.noaa.gov

April 20, 2021

Intensity and Impacts



April 15, 2021



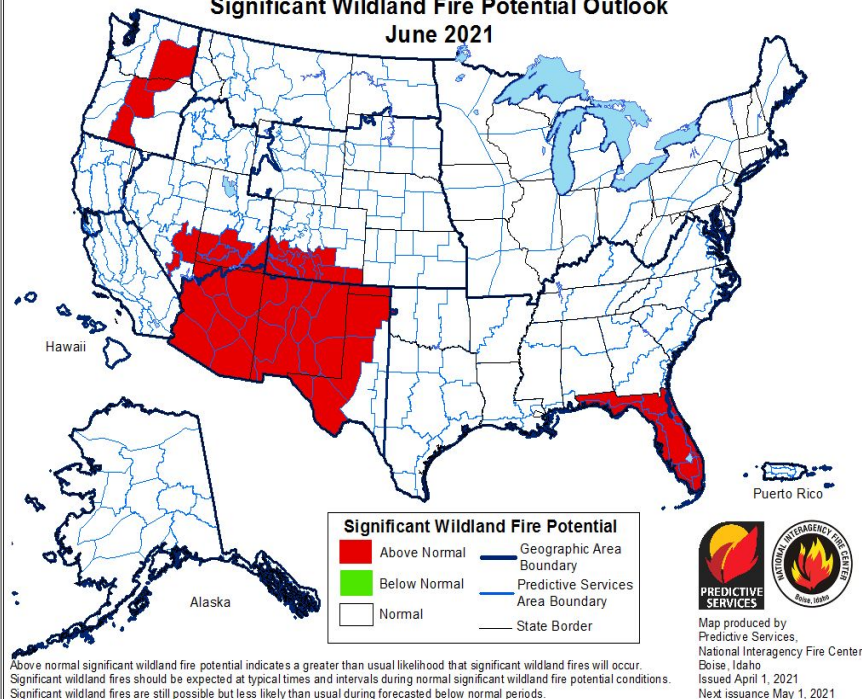
NATIONAL WEATHER SERVICE
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Seasonal Outlook 2021

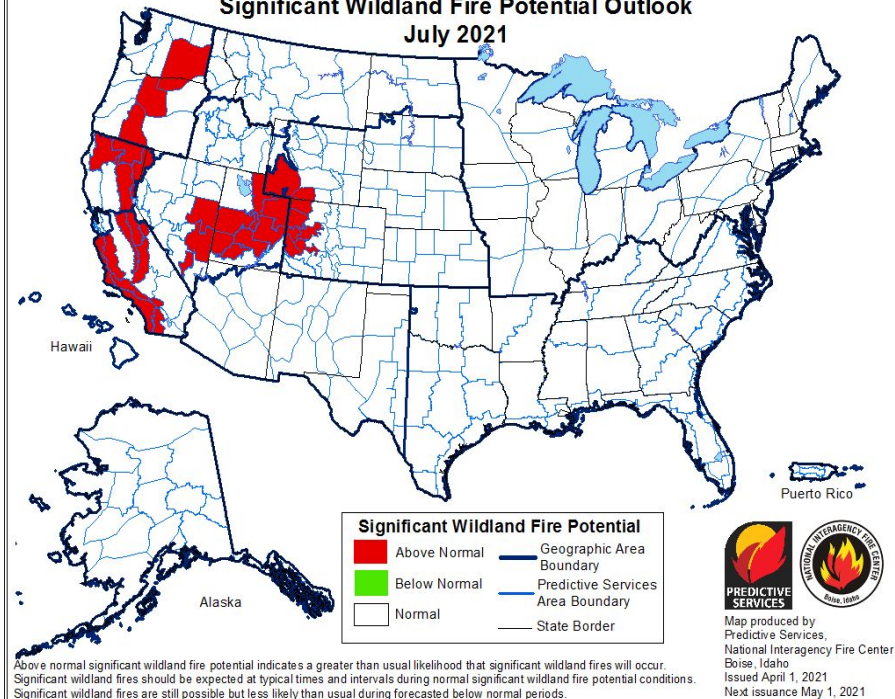
Wildland Fire Potential

www.nifc.gov

Significant Wildland Fire Potential Outlook
June 2021



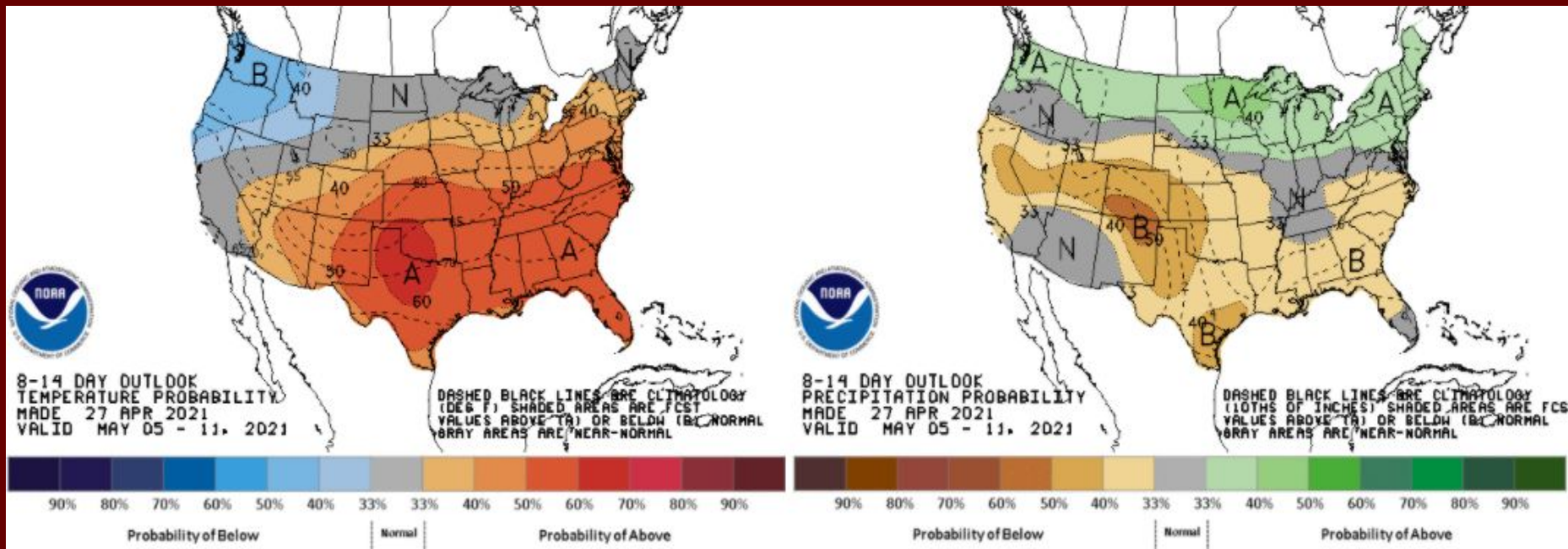
Significant Wildland Fire Potential Outlook
July 2021



Seasonal Outlook 2021

8-14 Day Outlook

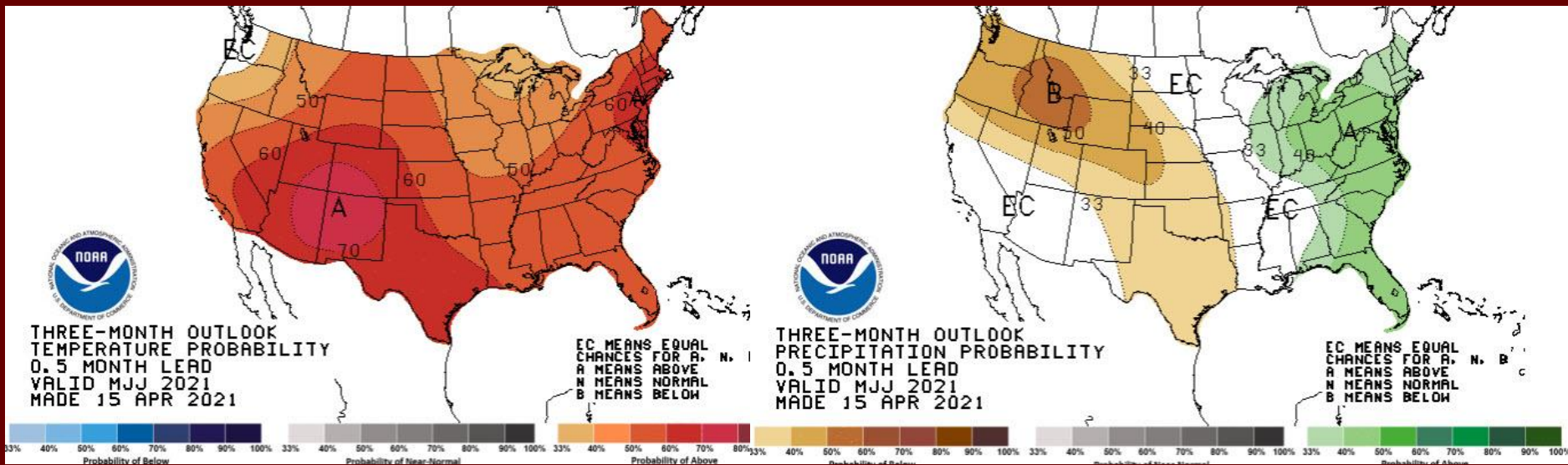
www.cpc.noaa.gov



Seasonal Outlook 2021

3 Month Outlook

www.cpc.noaa.gov



NWS + Weather Spotters = Saved Lives

nws.spokane@noaa.gov

THANK YOU!

Any Questions?

I will unmute you - then you unmute yourself to talk.

What's Next?

You will receive a follow-up email

- register as a weather spotter
- Spotter ID
- Spotter training certificate

